

# BEVERAGE & FOOD WORLD

LB

Lib. 2/10/97

REGD.NO.R.N.31862/77

ISSN-0970-6194



JANUARY 1996

Vol. 23 • No. 1

Price: Rs. 35

ANNUAL NUMBER

832  
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## The Only Name to Remember for Ultrafine Filtration of Liquids and Gases

### Product Range

Liquid Filters upto 0.1 micron.

Widely used for chemicals, pharmaceutical, process water, edible oils, serum, electronic fluids etc.

Air Filters upto 0.01 micron.

For instrumentation, electronics, pneumatic systems, pharmaceutical, etc.

In-Line Conical Filters (ILCF). \*

For continuous filtration upto 800 LPH with interchangeable porosities from 100 upto 0.2 microns. Suitable for product filling and bottling lines, laboratories, research centres etc.

\* Design registered and patented.



## Kumar Ultrafine Filters

Stainless Steel Lab Filters.\*

With interchangeable porous media from 100 upto 0.2 microns. Most ideal for laboratories, research centres and all chemists with research mind.

### Materials of Construction

Filter Cartridges and Discs are made of chemically compatible materials like Polypropylene, Nylon, PVC, PVDF, PTFE, Glassfibre, Sintered Bronze, Sintered SS, Impregnated paper etc.

Filter Housings are fabricated out of Stainless Steel, Carbon Steel etc. Linings of Rubber, FRP, PVDF, etc. are also undertaken. Coded construction under Third Party Inspection are possible.



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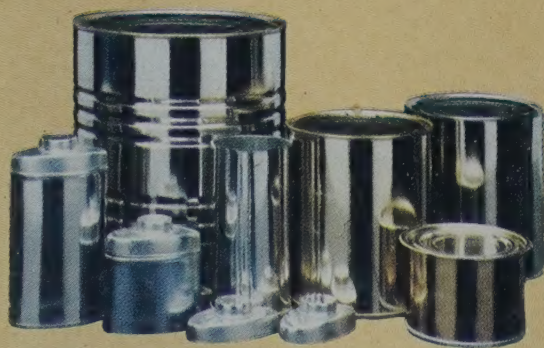
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Soft drinks  
Beverage products,  
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Dark breads  
Cookies  
Cake Mixes Dark  
Cake Mixes Light

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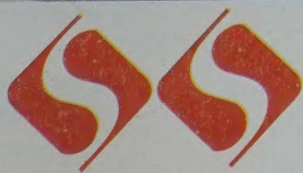
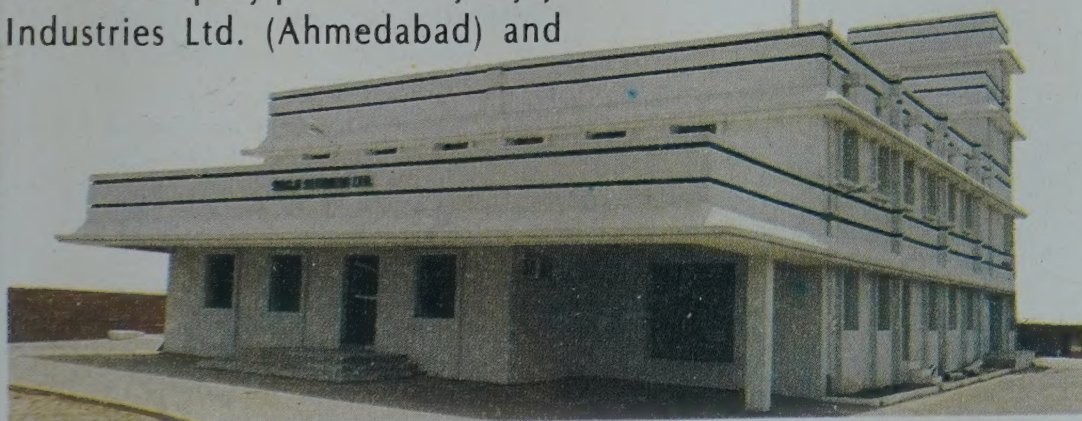
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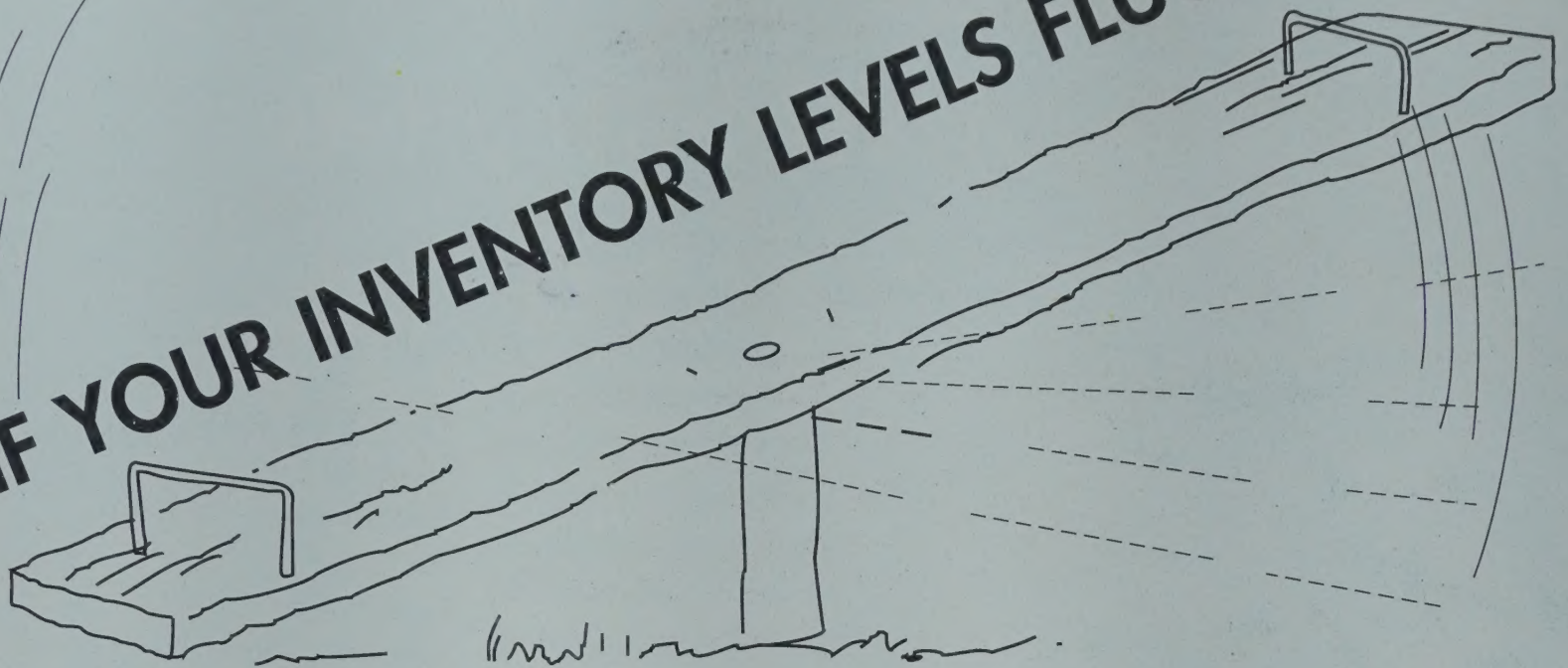
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# IF YOUR INVENTORY LEVELS FLUCTUATE



## DON'T CHANGE YOUR INVENTORY. CHANGE YOUR SYSTEM.

Use a conventional tank gauging system, and inventory management becomes a guessing game. Because these systems depend on "level" measurement which is an unstable parameter.

The result? Inaccurate measurement of inventory, affecting your profits & business.

The clue to the solution: Measurement by Mass.

Using the Hydro-static Tank Gauging (HTG) System, pioneered in India by Fisher-Rosemount.

The HTG system's main function, of course, is to deliver accurate tank measurement, using the stable parameter of mass, resulting in accurate inventory control.

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It makes more tank parameters - level, density and volume in addition to mass - available to you on-line, both at the tankside and in the control room.

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It's installation is simple and relatively inexpensive, with no need



for stilling wells or dedicated AC power to tankside equipment.

And it caters to a wide range of applications, including refineries, chemicals, food & beverage, pharmaceutical, chemicals and product marketing terminals.

Best of all, it comes to you from Fisher - Rosemount, world leaders in process management.

With years of expertise, and a wide product range, Fisher - Rosemount offers a single, technologically superior source for all your process instrumentation needs.

So, before you invest in your conventional system, talk to us at Fisher Rosemount.

And the only thing that will change, is your mind.

**FISHER-ROSEMOUNT™**  
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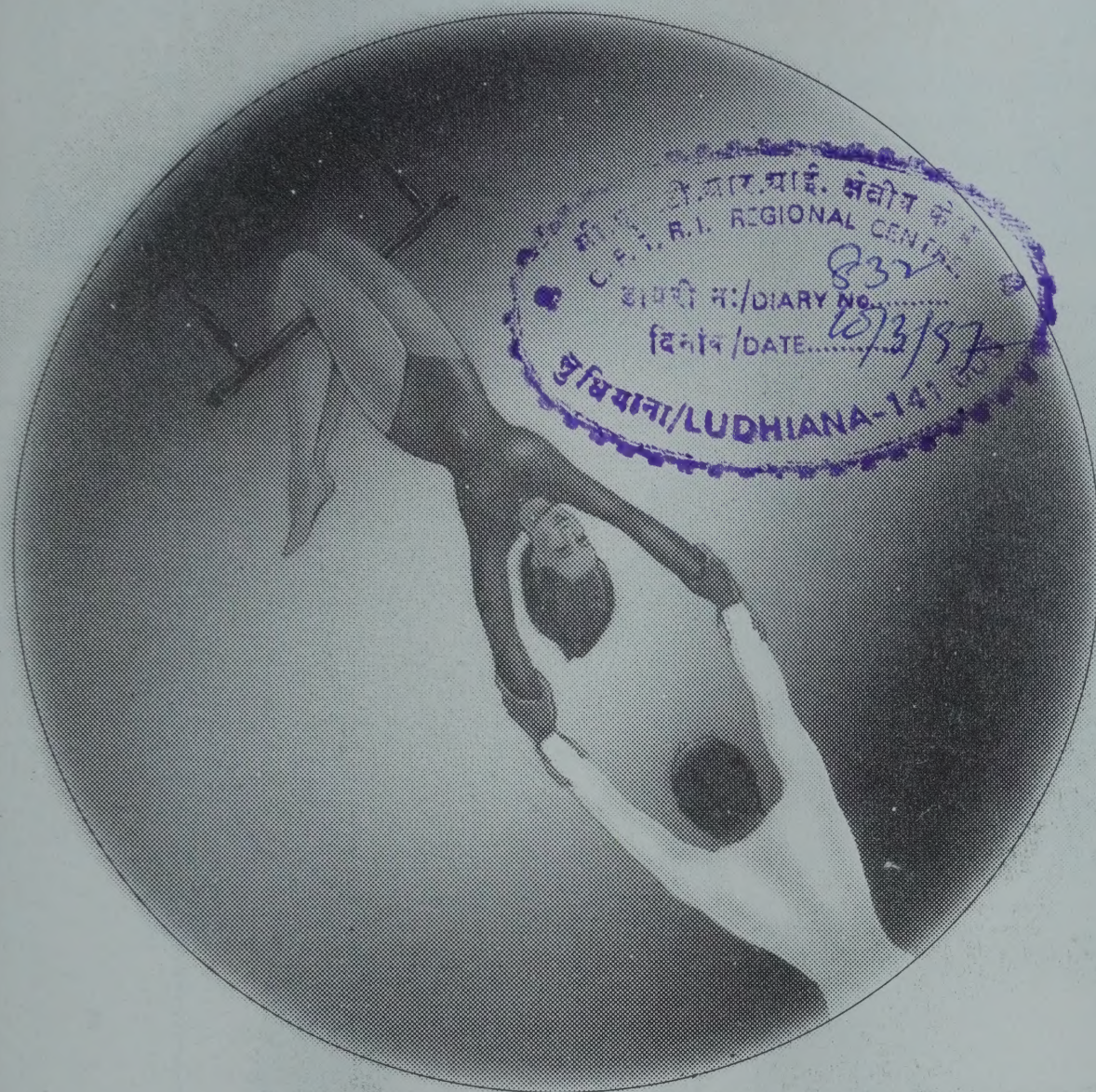
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Tel.: (022) 2874758/59, 2851066, 2851774, 2851734. Tlx: 011-83757 JSGR IN.

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TRANSFERS  
WITH  
ABSOLUTE  
CONFIDENCE**

## The Micro Motion Mass Flowmeter from Fisher-Rosemount

Moving liquid, gas or slurries from one terminal to another can give you many anxious moments.

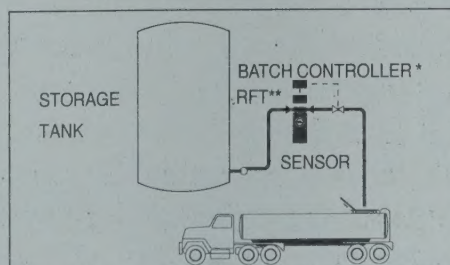
Because when temperature and pressure affect your consignment, your profits hang in the balance.

Which is why you'll appreciate the reliability of Fisher-Rosemount's Micro Motion Mass Flowmeter.

### APPLAUDED BY ALL

The Micro Motion Mass Flowmeter is particularly recommended for Custody Transfer applications, as in the case of Cochin Refinery (CRL)\* and Hindustan Organic Chemicals Ltd. (HOCL). A set of Mass Flowmeters are used to transfer LPG

from the Marketing Terminals at CRL into the receiving terminal at HOCL and return the processed LPG back to the refinery. The flow output signals from the meters at both terminals verify the transfer quantities and form the basis of billings. With the accuracy achieved due to measurement by mass, previous discrepancies as with PD meters have altogether disappeared.



### ON FIRM GROUND

Hardly surprising, therefore, that with its accuracy, adaptability and range, the Micro Motion Mass Flowmeter has an installed base of more than 1500 units in India, and 1,50,000 worldwide. Across a wide range of applications in fuel oil transfers, particularly in furnace oil, LSHS and LDO. And in custody transfers for petroleum products like LPG, Naphta and chemicals like Phenol and Aniline.

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Automatic Bread/Bun Baking Travelling Oven



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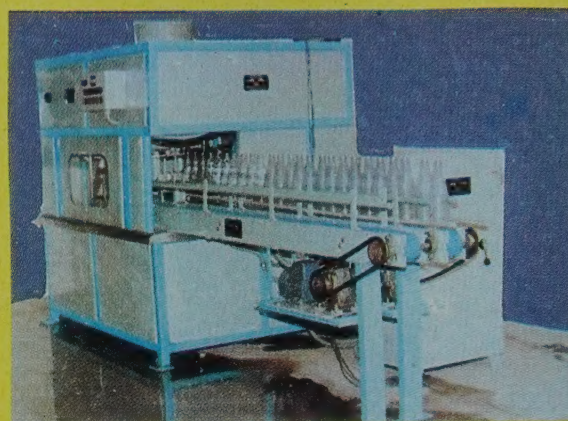
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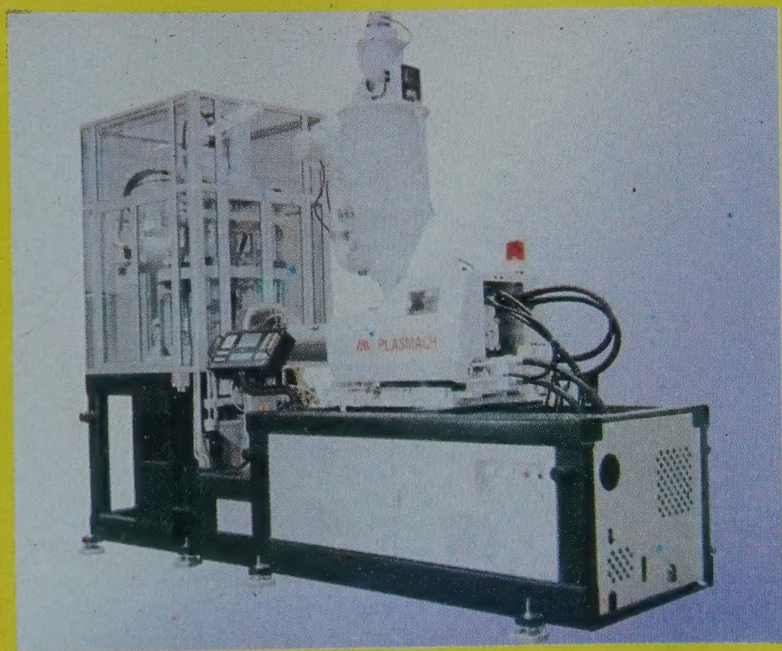


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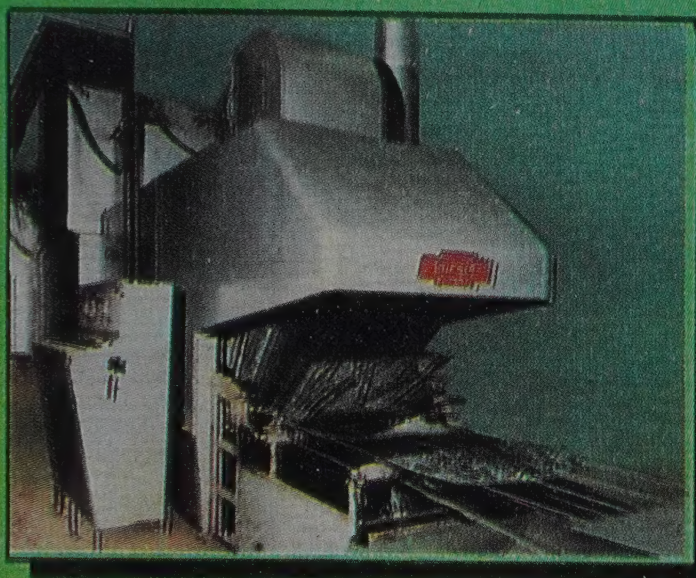
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Where health is a habit

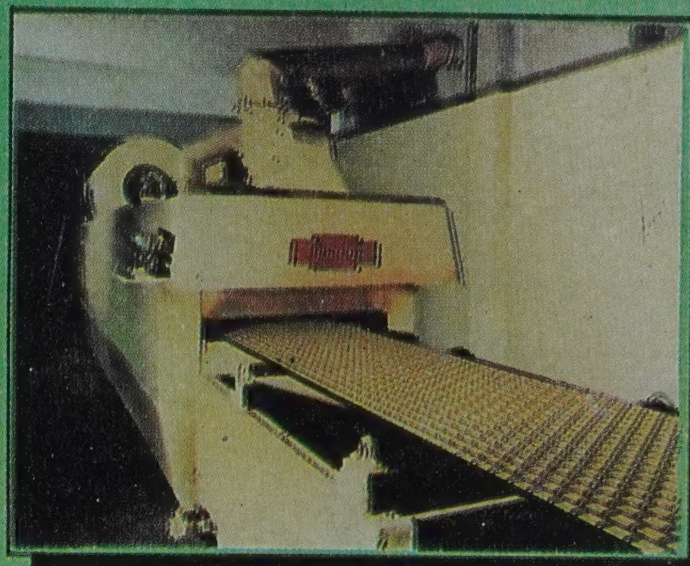


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## A name synonymous with Quality



TIN/METAL DECORATING OVEN

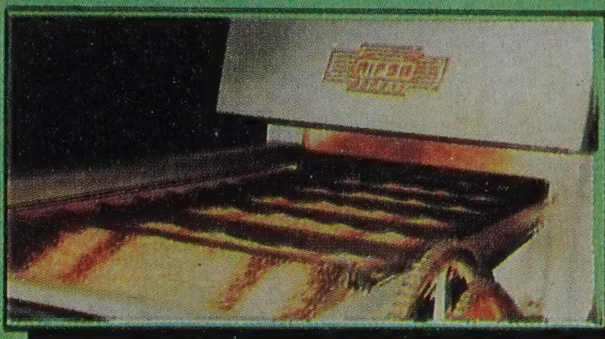


BISCUIT/BREAD BAKING OVEN

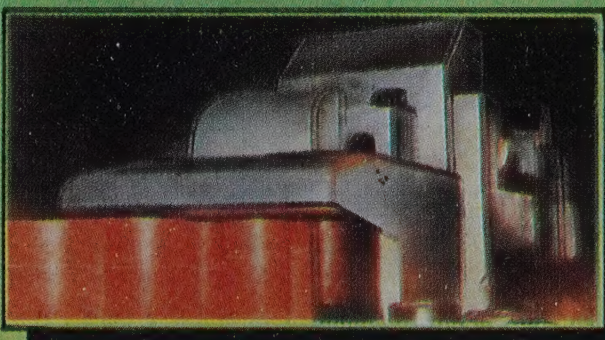
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for:

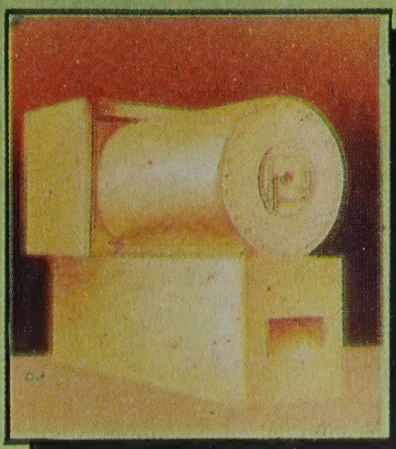
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SUPARI DRYING OVEN



BARREL DRYING OVEN



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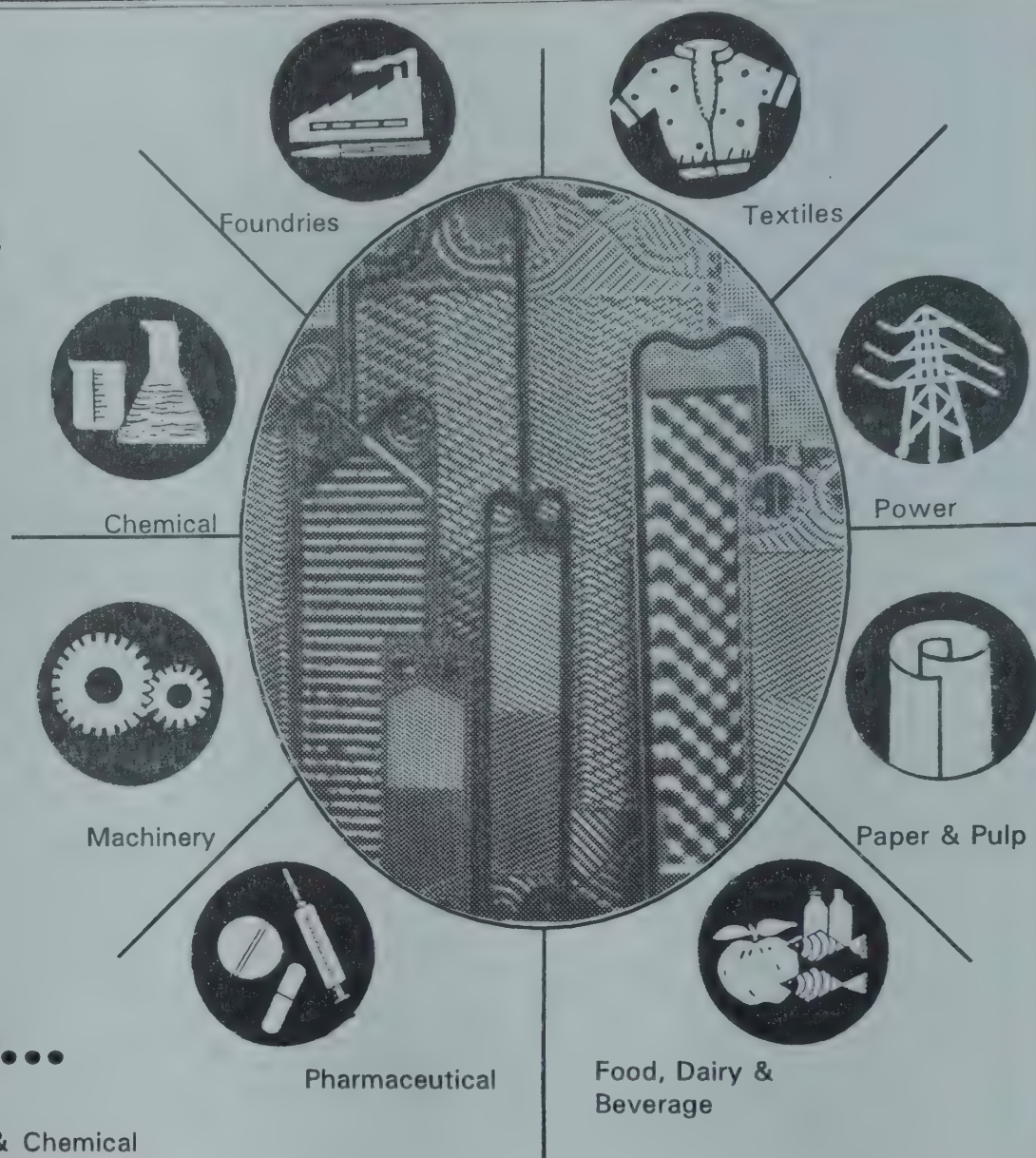
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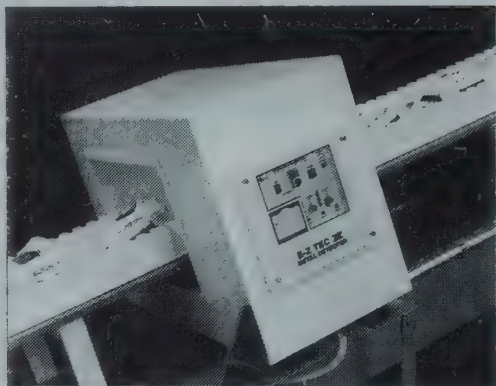
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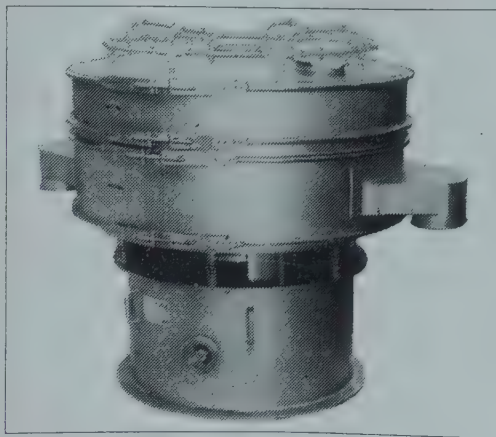
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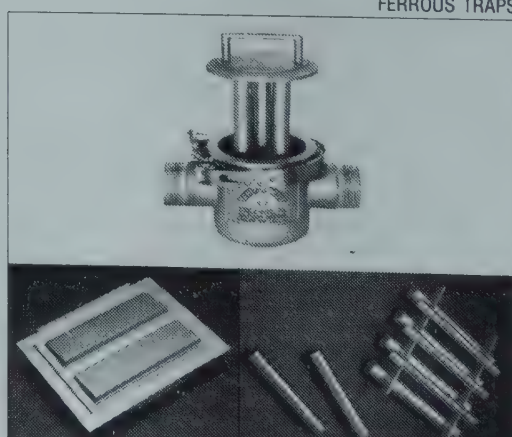
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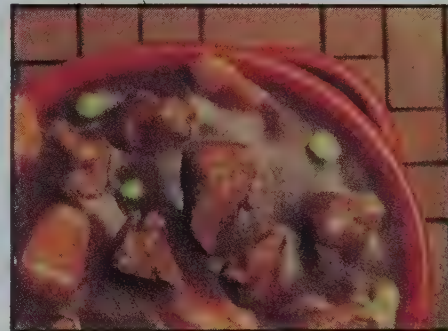
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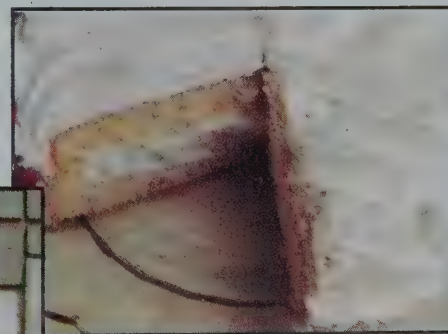


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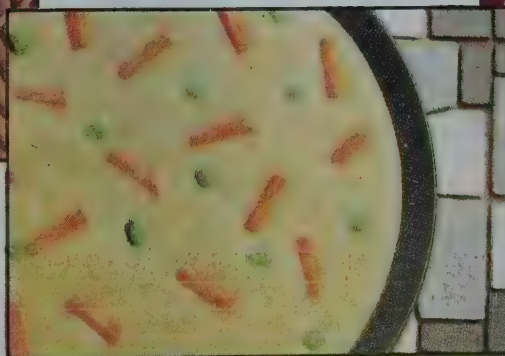
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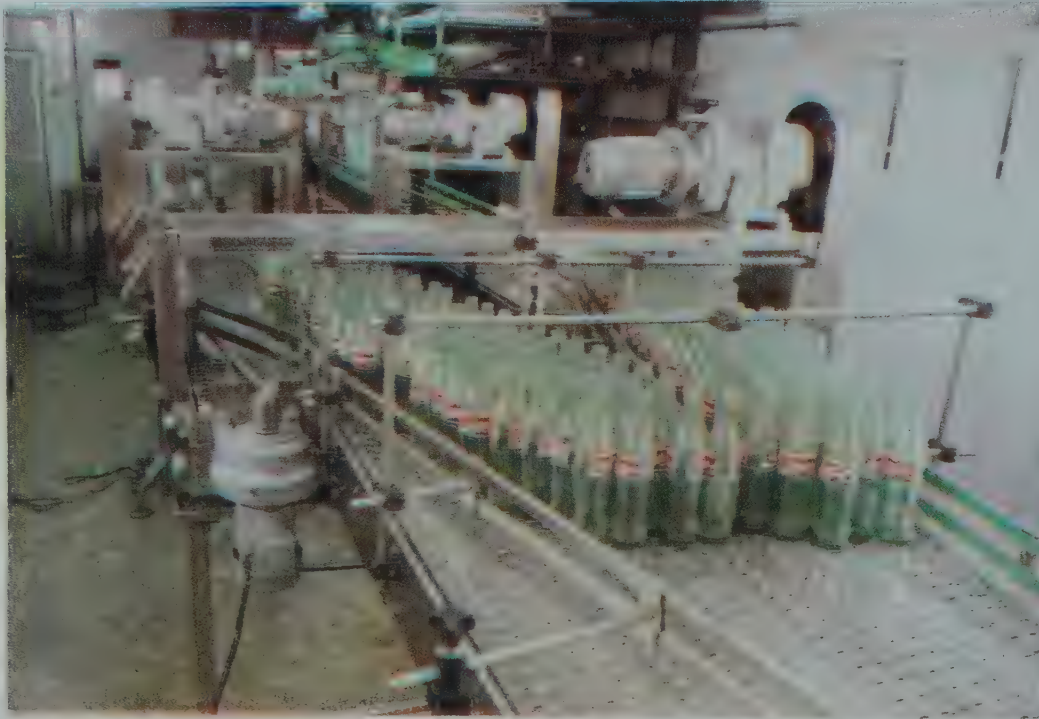


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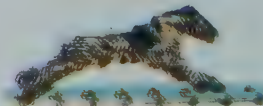
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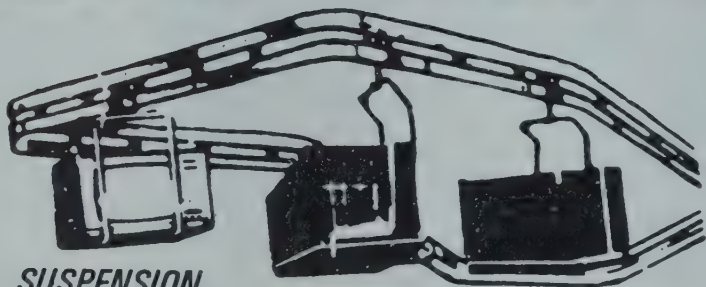
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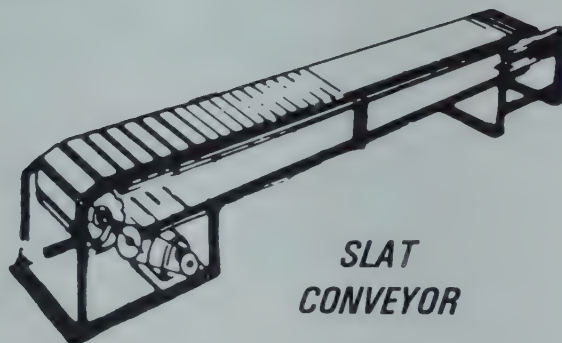
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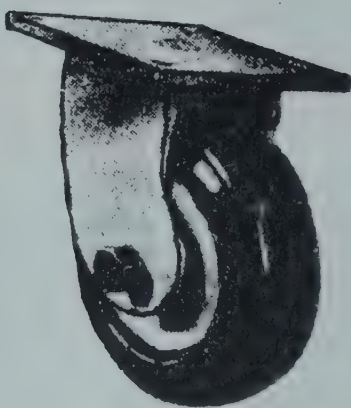
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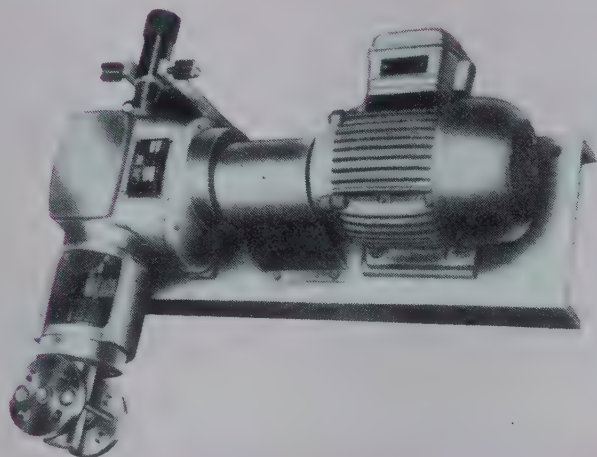
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**Published, Printed,  
Edited and Owned by:**  
Norman J. da Silva

**Asst. Editor :**  
Ms. Rosalie Fernandes

**Advertising Executives :**

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**PUNE**

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3rd Flr., S. No. 29-1A/2, Wadgaon Budruk,  
Pune 411 041. Tel: 472748

**RAJKOT**

Sukruti Advertising, 2nd Floor, Dwaram,  
Above Central Bank, Dr. Yagnik Road,  
Rajkot 360 001. Phone: 47950

**Published by :**

The Amalgamated Press  
Narang House, 41, Ambalal Doshi Marg,  
Bombay 400 023. Tel.: 2650268/2654184  
Gram: "Amalpres", Bombay 400 023.  
Fax: 91-022-2650287 Attn: Da Silva

**Printed at :**

Fast Print Service, 308, Shri Hanuman Ind.  
Est., G.D. Ambekar Rd., Bombay 400 031.

**Annual Subscription:**

Rs. 150.00 Post-paid  
Overseas : US \$ 30.00 by Airmail

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# CONTENTS

	Page No.
Editorial	... 22
Development of Instant Vegetable Wadi by G.K. Sharma, A.D. Semwal and S.S. Arya	... 23
Dehulling Technology by L.D. Patel	... 25
New Dimensions in Cullet Processing by G.C. Singhal and D.P. Rane	... 26
Cancer Preventive Foods by A.K. Srivastava and Y.K. Jha	... 28
Silver Ion Disinfection and its Practical Application by Gustav Schmid	... 33
Importance of all Detector and Separator in Food Industry by D P Rane and M S Mandke	... 35
Investment Opportunities in India	... 36
Appropriate Post Harvest Technology of Horticultural Crops by Vijay Sethi	... 41
Antibiotic and Drug Residues in Milk Products by L. Sabikhi and A.A. Patel	... 47
Prevalence of Enteropathogens in Fresh Juices of Fruits and Vegetables by B.R. Singh, K.N. Kapoor, R.S. Rathore, A.S. Yadav R.K. Agarwal, K.N. Bhilegaonkar and Ashok Kumar	... 51
Preparation of Some Food Products from Wood Apple by V.B. Kalamgh and P.A. Unde	... 53
Antimicrobial Food Preservatives - Indian Scenario by Dr. S.S. Arya	... 55
Potato Flour from Waste Potatoes by V.R. Sagar, S.B. Maini & Sahni, Charanjit Kaur	... 59
News & Notes	... 65
Company News	... 71
Export Highlights	... 81
Export Opportunities	... 82
Trade Fairs & Exhibitions	... 83
Book Reviews	... 85
Product Reviews	... 91
Buyers' Guide (Part I)	... 133
Buyers' Guide (Part II)	... 135



**Editorial ....**

Food producers and manufacturers in Asia are in a very privileged position to-day. World leaders in food processing technologies and applications are knocking at their doors, offering an extraordinary range of services superior to those they offer at home. Some companies have taken the lead in setting up manufacturing and assembling plants in countries which give them a competitive advantage. Others have spent time and highly skilled resources on building new technical centres and pilot facilities with a special emphasis in Asian - based applications.

With its varied climatic conditions, flora and fauna, besides being blessed with year round sunlight, India is ideal for developing the cultivation of a large number of exotic species of fruits and vegetables. However, in terms of exports or processing of fruits and vegetables, India is nowhere near any of the other major fruits and vegetables growing countries, although such countries are much smaller in size and do not enjoy such natural factors as India enjoys. The main reason for this is the highly perishable nature of these products and the lack of adequate infrastructure to deal with such problems. Such a situation exists in spite of the fact that we do not lack in R & D efforts in this field. However, of late, efforts at improving the shelf life of vegetables and fruits and introducing better processing facilities are taking shape. Both government and non-Governmental Corporate houses have also joined in preservation of fruits and vegetables by freezing, drying, etc. and manufacture of popular domestic needs from fruits and vegetables like tomato puree, tomato paste, garlic / ginger paste, etc.

Food exports have risen from Rs. 29.36 million in 1991-92 to Rs. 47.085 million in 1993-94. Clearly, this is an industry ripe with promise. Since food processing is a high priority industry, foreign investment in this sector is high, and already amounts to Rs. 1126.70 crores.

India ranks among the lowest in the world in per capita consumption of soft drinks and beers. That presents an enormous source of untapped growth. Today India is the target for international producers of all kinds of beverages, alcoholic and non-alcoholic. The future will witness the entry of varied brands of beverages - tea and coffee, flavoured milk, soft drinks, sherbets, fruit juices, alcohol and more.

The hospitality industry is the third largest earner of foreign exchange for India. However, India accounts for only 0.4% of world tourism trade. That means an enormous potential for growth.

With globalisation, travel to India, especially business travel, has increased considerably. Forex earnings from tourism are expected to touch Rs. 100,000 million in 1995-96.

The immediate future will see new 5-star and budget hotels set up by established Indian companies, tie-ups with international hotel chains and ambitious ventures from foreign companies like Best Western, Quality Inn and South Pacific Hotels. Hotels are already upgrading their standards to offer better in-room services and business facilities.

**"BEVERAGE AND FOOD WORLD** bi-monthly enters its 23rd year of service to the Food/Beverage Industries with its **Annual Number**. This issue is being circulated among visitors - both Indian and foreign - to the Exhibitions given below.

**F & B - TECH, TRIPLE EXPO '96** at the NSE Exhibition Complex, Coregaon, Bombay from 20-24 February 1996, is organised by EXCEL India along with ISC Köln Messe, Germany (organisers of the well-known food processing exhibition - ANUGA), and sponsored by Ministry of Food Processing Industries, (Government of India), APEDA, Chemtech Foundation, and PPMAL. **F & B Tech** brings together three industries that complement each others' business and growth - Food Process, Drink Tech, and Hospitality World. The Triple Expo, expected to be on a global scale, brings together buyers & sellers showcasing technologies, products and services over 22000 sq. mtrs.

**AHARA '96** - Food and Equipment Show - to be held at Pragathi Maidan, Delhi from 8 to 11 March 1996 is the 11th international edition of this fair, showcasing products of over 300 exhibitions from India and overseas. The Exhibition is organised by Indian Trade Promotion Organisation (ITPO) in collaboration with APEDA, ARCHI, CIFTI and HOTREMAI. **Ahara '96** will have all 3 industries joining together - Food Products, Processing/Packaging Plants and Machinery and Hotel Equipment and Supplies, and as in previous years is expected to have around 50,000 visitors from India and abroad.

**Editor**



# Development of Instant Vegetable Wadi

by

G.K. Sharma, A.D. Semwal and S.S. Arya\*

Defence Food Research Laboratory, Mysore - 570 011, India

## Abstract

*Preparation of instant vegetable wadi, an Indian traditional savoury food and their storage behaviour in different packaging materials has been reported. Instant spiced vegetable wadi remains acceptable for 12 months both at RT and 37°C in polypropylene and paper-Al. foil-polyethylene pouches while unspiced wadi remained acceptable for 9 months and 6 months at RT and 37°C respectively in polypropylene pouches. In paper - Al. foil - polyethylene laminate pouches unspiced wadi remained acceptable for 12 months and 9 months at RT and 37°C respectively. During storage, peroxide value (PV), TBA value and FFA increased while total carotenoids decreased considerably with a concomitant decrease in sensory acceptance.*

Wadi, a savoury legume product, is prepared from blackgram or greengram dhal, after soaking, wet grinding, mixing salt and spices in the soft dough followed by sun drying of suitably formed dough lumps. Traditionally prepared wadis, though highly relished in the form of curry and also good source of proteins and minerals, take long time (20 - 25 min.) for cooking and also contain high levels of microorganisms ( $10^3$  colonies/g). On the other hand, supply of fresh vegetables in high altitude snow bound areas during winter months is logistically highly difficult and therefore easy to cook instant spiced vegetable wadi may prove to be quite useful for providing variety in the diet of troops deployed in these areas. The present paper describes the optimisation of the process for preparation of easy to cook vegetable-legume wadi and its storage stability and packaging requirement.

## Materials and Methods:

**Raw materials:** Dehusked bengalgram (*Cicer arietinum*) and blackgram (*Phaseolus mungo*) dhals were ground in a commercial mill to obtain bengalgram flour (besan) and blackgram flour. Good quality potatoes, onions, bottle gourds, carrots, vanaspati, salt and spices were procured from the local market.

**Processing:** Carrots (1.5 kg) and bottlegourd (3.4 kg) were separately

trimmed, peeled, grated and cooked in an autoclave for 15 min at 15 PSI steam pressure. Cooked vegetables were pressed by hand to remove excess water and provided 600 g each of cooked strained vegetable. Potatoes (1.0 kg) were first cooked for 15 min in an autoclave under 15 PSI steam pressure and subsequently cooled, peeled and washed to obtain 600 g paste.

Bengalgram or blackgram flour (200 g) was mixed with water (800 ml) and vanaspati (20 g) and cooked for 10 min. to obtain a smooth paste. The cooked bengalgram paste was mixed with cooked carrots (600 g), potatoes (600 g) and bottlegourd (600 g), salt (10 g), garlic (1 g), chilli powder (5 g), turmeric powder (2 g), black pepper (2 g) and ginger powder (2 g). The ingredients were mixed thoroughly and fluffy dough was manually divided into 15-20 g spherical pieces (wadis) which were dried for first 2 hrs at 60°C and subsequently at 80°C for 6 hrs in hot air drying cabinet (Model SDA, Type E, Kilburn, Macneill & Magor Ltd. Calcutta) to bring moisture level below 5%.

**Preparation of spice mix :** Spices mix was prepared by mixing chilli powder (25 g), turmeric powder (25 g), coriander powder (65 g), cumin seed powder (70 g), clove powder (5 g), cinnamon powder (2.5 g), black pepper powder (5 g), black cardamom powder (2.5 g), ginger powder (45 g), dry garlic powder (5 g), fried onions (625 g), salt (94 g) and corn starch (31 g).

**Blending:** Vanaspati (175 g) was heated in a stainless steel vessel to 120°C and spice mix (550 g) was added to the hot vanaspati with continuous mixing. The vessel was removed from the flame and wadis (1 kg) were added in the hot spice mix stirred continuously to ensure uniform coating of spices to wadis.

**Packaging :** Both spice coated and unspiced wadis (400 g) were packed in polypropylene (PP, 75  $\mu$ ) and paper (42 GSM)-Al. foil (20  $\mu$ )-polyethylene (37.5  $\mu$ ) laminate (PFP) pouches and stored at room temperatures (RT) and 37°C. Initially and after every three months, samples were analysed for moisture, peroxide value (PV), free fatty acids (FFA), thiobarbituric acid value (TBA), total carotenoids and sensory score by the methods reported earlier (Sharma et al 1992). Ini-

tially the samples were also analysed for proximate composition. Mineral composition of wadis was determined by atomic absorption spectrophotometer (Model AA 170, Shimadzu, Kyoto, Japan) after wet digestion of the samples with sulphuric and nitric acids (Jacob, 1958).

**Sensory evaluation:** Spices coated wadis were reconstituted by mixing 100 g wadis with 400 ml water and boiling for 3 min. For reconstitution of unspiced wadi, vanaspati (17.5 g) and spices mix (55 g) were heated and 400 ml water and 100 g wadi were added and heating continued for 3 min.

Reconstituted wadis were given to a panel of 10 trained judges for evaluation of quality with respect to colour, texture and flavour and overall acceptability on a nine point hedonic scale with 9 for excellent in all respects while 1 for highly disliked samples.

**Adsorption-desorption characteristics:** Powdered samples (20 g) of spiced and unspiced wadis were stored in petri dishes (10 cm dia) in desiccators containing phosphorous pentoxide and saturated solutions of magnesium chloride, sodium bromide and sodium nitrates to obtain water activity ( $a_w$ ) of 0.0, 0.33, 0.57 and 0.73 respectively. Initially and periodically stored samples were analysed for moisture content.

## Results and Discussion

Traditionally wadis are prepared from ungelatinised legume flours and therefore these take longer periods (20-25 min) for cooking. Pregelatinisation of legume flours considerably improves the cooking characteristics. Incorporation of cooked and strained vegetables further reduced their cooking time. It has been observed that wadis prepared by taking 10 parts bengalgram flour and 30 parts each of cooked and strained carrots, bottlegourd and potatoes required least cooking time for reconstitution. Increasing proportion of carrot in the recipe or replacing blackgram dhal flour in place of bengalgram flour increased the cooking time and also reduced the overall acceptability score (Table 1). The wadis prepared with above composition had an overall acceptability score of  $7.8 \pm 0.4$  on nine point hedonic scale and

\*Corresponding Author



**Table 1: Standardisation of Recipe for Instant Vegetable Wadi**

Ingredients	Parts (%)					
	Batch 1	2	3	4	5	6
Bottlegourd	20	20	50	25	30	30
Carrot	50	20	20	25	30	30
Potato	20	50	20	25	30	30
Bengalgram flour	10	10	10	25	10	-
Blackgram flour	-	-	-	-	-	10
Reconstitution time (min)	6	4	4	4	3	5
Overall acceptability*	7.2±0.2	7.4±0.3	7.4±0.2	7.0±0.4	7.8±0.2	5.9±0.5

\* Mean ± SD (n = 10)

**Table 2: Proximate Composition of Instant Spiced and Unspiced Vegetable Wadi**

	Spiced Wadi	Unspiced Wadi
Protein (%)	10.73	14.41
Fat (%)	23.94	6.65
Total ash (%)	5.85	4.72
Acid Insoluble ash (%)	0.67	0.54
Moisture (%)	3.24	3.42

**Table 3: Mineral Composition (ppm) in Spiced and Unspiced Vegetable Wadi**

	Spiced Wadi	Unspiced Wadi
Sodium	45,000±150	8000±88
Potassium	13,840±75	6400±25
Calcium	2891±20	130±8
Iron	227±11	457±13
Zinc	47±2	45±1
Copper	0.8±0.005	2.4±0.16

reconstituted in 3 min in boiling water.

The proximate composition of spiced and unspiced wadis is given in Table 2. The protein content was lower while fat content and total ash content were higher in instant spiced wadi as compared to unspiced wadi. These differences are as a result of addition of vanaspati and spice in the instant spiced wadis. The mineral composition of spiced and unspiced wadis is given in Table 3. Spiced vegetable wadi equilibrated to 1.69, 4.77, 9.26 and 15.08% moisture while unspiced vegetable wadi equilibrated to 1.78, 5.20, 10.20 and 16.39% moisture at 0.0, 0.33, 0.57 and 0.73  $a_w$  respectively. Slightly lower equilibrium moisture in spiced vegetable wadi is expected because of higher fat content in them. However, upto 0.73  $a_w$  neither spiced vegetable wadi nor unspiced vegetable wadi supported mold growth or any other type of microbial activity during storage at room temperature upto 60 days.

**Effect of packaging material on storage deterioration:** Because of very low

moisture in instant vegetable wadis, off flavour emanating from oxidative degradation of lipids and carotenoids is the major cause of reduced acceptance of wadis during storage. The changes in PV, TBA, FFA, total carotenoids, moisture content and overall acceptance scores of spiced and unspiced wadis when stored at RT and 37°C in PP and PFP pouches are given in Table 4 and 5. It may be observed that PV, TBA and FFA increased during storage while total carotenoids decreased in all the samples stored both at RT and 37°C. Relatively the rate of lipid oxidation as indicated by increases in PV and TBA was higher in wadis stored in PP at 37°C. The changes in FFA also followed the same pattern as that observed in PV and TBA. Though in stored foods FFA are generally believed to be formed through lipolysis of lipids, in the instant wadis enzymes are inactivated during cooking and drying operations and increases in FFA occur as a result of secondary degradation products of peroxides. The same pattern has been observed previously in instant halwa mix (Arya and Thakur, 1986). The changes in carotenoids also followed the same pattern, the decreases being lower in PFP than in PP samples.

Interestingly, the rate of oxidative degradation was much slower in spiced wadis than in unspiced wadis. After 12 months storage, PV in spiced wadi were 15.8 and 9.0 at RT and 18.1 and 12.2 at 37°C in PP and PFP pouches respectively as compared to 70.4 and 60.2 at RT and 86.3 and 68.0 at 37°C in unspiced wadi samples. Carotenoids degradation was also considerably less in spiced wadi. After 12 months of storage at 37°C, instant spiced wadi retained 73 and 80.7% carotenoids while unspiced wadi retained only 28 and 32.4% carotenoids when stored in PP and PFP

pouches. At room temperature spiced wadi retained 79.9 and 9.3% carotenoids while unspiced wadi retained only 34.6 and 37.2% of total carotenoids after 12 months storage in PP and PFP pouches clearly showing the beneficial effects of spices in inhibiting oxidative degradation of lipids and carotenoids in instant wadi. Beneficial effect of spices and vanaspati on the storage stability of precooked dehydrated rice has also been observed previously (Semwal and Arya, 1992). The overall acceptability scores of spiced and unspiced wadi packed in PP and PFP pouches on storage are given in Table 4 and 5. The overall acceptability scores of spiced wadi

**Table 4:**

Changes in Peroxide Value (meq O<sub>2</sub>/kg fat), free fatty acid (% oleic acid), Thiobarbituric acid value (mg malonaldehyde/kg sample), Total Carotenoids (µg/g), Moisture (%) and overall acceptability (OAA) of instant spiced vegetable wadi during storage at room temperature (RT) and 37°C in different packaging materials

Parameters	Storage temp. (°C)	Storage period (months)			
		6		12	
		PP	PFP	PP	PFP
PV	RT	10.6	6.7	15.8	9.0
	37	13.2	8.2	18.1	12.2
FFA	RT	1.03	1.18	2.14	2.34
	37	1.34	1.46	3.11	3.17
TBA	RT	0.21	0.21	0.25	0.23
	37	0.28	0.26	0.35	0.31
Carotenoids	RT	102.7	105.8	85.9	93.0
	37	96.2	102.7	78.5	86.8
Moisture	TR	5.34	4.52	6.25	5.24
	37	4.51	4.69	4.40	4.63
Overall acceptability*	RT	7.5±0.53	7.8±0.42	7.4±0.63	7.7±0.48
	37	7.4±0.90	7.5±0.62	7.3±0.48	7.5±0.52

All the results are mean of two values.

\* Mean ± SD (n=10)

The initial values of PV, FFA, TBA, total carotenoids, moisture and overall acceptability were 4.5, 0.23, 0.21, 107.5, 3.24 and 7.8±0.42 respectively.

**Table 5: Changes in Peroxide value (meq O<sub>2</sub>/kg fat), free fatty acid (% oleic acid), Thiobarbituric acid value (mg malonaldehyde/kg sample), Total Carotenoids (µg/g), moisture (%) and overall acceptability (OAA) of unspiced Vegetable wadi at room temperature (RT) and 37°C in different packaging materials**

Parameters	Storage temp. (°C)	Storage period (months)					
		6		9		12	
		PP	PFP	PP	PFP	PP	PFP
PV	RT	50.1	43.6	57.2	46.5	70.4	60.2
	37	64.4	56.3	75.0	60.0	86.3	68.0
FFA	RT	5.00	3.35	6.33	4.35	8.46	5.07
	37	6.04	5.45	7.17	6.93	9.43	7.85
TBA	RT	0.32	0.29	0.39	0.31	0.42	0.34
	37	0.38	0.36	0.46	0.41	0.51	0.44
Carotenoids	RT	80.1	88.3	67.2	72.2	63.2	68.0
	37	66.8	74.3	56.3	63.1	51.1	59.2
Moisture	RT	6.46	4.69	6.65	4.92	5.95	5.71
	37	4.80	4.57	5.10	4.39	5.86	4.42
OAA*	RT	7.6±0.79	7.4±0.90	7.4±0.88	7.4±0.90	6.6±0.52*	7.5±0.53
	37	7.4±0.90	7.1±0.52	6.7±0.88*	7.10.88*	6.5±0.53*	6.9±0.32*

All the results are mean of two values.

\* Mean ± SD (n = 10). a - Significantly different from initial value at 99.9 per cent confidence.

The initial values of PV, FFA, TBA, total carotenoids, moisture and overall acceptability were 16, 8, 0.70, 0.23, 182.6, 3.42 and 7.8 ± 0.42 respectively.



packed in PFP did not change significantly when stored at RT and 37°C during the entire storage period. The overall acceptability scores of unspiced **wadis**, however, decreased significantly after 6 months storage when stored in PP at 37°C and after 12 months storage at RT. In PFP pouches the changes were significant only after 12 months storage at 37°C. The changes in overall acceptability scores of **wadi** on storage were mainly due to development of stored odours. There was practically no changes in the texture and colour of the stored products.

Taking an overall acceptability score of 7.0 as the cut off point for perceptible changes, instant spiced **wadi** have a shelf life of 12 months both at RT and 37°C when

packed in PP and PFP pouches. The unspiced **wadi** in PFP pouches remained stable for 12 and 9 months at RT and 37°C respectively, but in PP pouches, these remained stable for 9 and 6 months at RT and 37°C.

From the foregoing discussion, it is evident that highly acceptable instant wadi can be prepared by precooking legume flours and vegetables and by drying them to moisture level below 5%. Spicing of wadi enhances their stability during storage and instant spiced wadi remains stable for more than one year at 37°C.

#### Acknowledgement

We wish to thank Dr. (Mrs) R. Sankaran, Director, Defence Food Re-

search Laboratory, Mysore, for her help and encouragement during the course of study.

#### References

- Arya SS, Thakur BR (1986). Instant halwa (kesari bath) mix - storage stability and packaging requirements. *Indian Food Industry* 5:119-121.
- Jacob MB (1958) *The Chemical Analysis of Foods and Food Products*. ed 3, D Van Nostrand Company Inc., Princeton, New Jersey
- Semwal AD, Arya SS (1992) Effect of spices and salt on the storage stability of precooked dehydrated rice. *J. Food Sci Technol* 29:210-213
- Sharma GK, Madhura CV, Arya SS (1992) Studies on preparation, packaging and storage of Besan (Bengalgram flour) Burfi. *J. Food Sci Technol* 29: 289-292

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## Dehulling Technology

by

L.D. Patel

Managing Directors Goldin (India) Equipment Pvt. Ltd., Baroda

Nature's creation is beyond imagination of man. However it is exploited to his best use by man. Look at the delicate kernel of a seed! How beautifully it is protected by nature with number of covers on it! e.g. Coffee, Cherry, Neemfruits, Sunflower seeds, Groundnut pods, Safflower seeds, Almondnuts. Mangoes, Oil palm fruits, etc. etc.

It is an interesting and challenging job for an engineer to evolve a most suitable equipment to recover kernels out of seeds or fruits, and that too by removing protective coating of hulls or husk, without damage to kernels. And this is the area of engineering where know-how and experience of dehulling technology plays an important role for offering most suited equipment for each kind of seeds or fruits.

As is known, there are plenty of seeds

and fruits in the world and that too with widely differing characteristics and properties. Right from days of industrial revolution, varieties of equipment are developed and are being developed, for most efficient, damage free production of kernels; and separation of hulls/husks with minimum loss of useful products.

There are several factors which influence dehulling operation. These include, but are not limited to, moisture content, grading of seeds, impurities, structure of hulls, sublayers between hulls and kernels; etc. In order to achieve efficient dehulling performance it is necessary that all sorts of impurities are removed from the raw material of seeds. For this purpose modern cleaning machinerys with aspiration system as well as destoner machines are required. Thereafter it is advisable that a grading machine is employed to remove

shrivelled seeds & wrinkled seeds so that good bold seeds are fed to dehulling machines, which is the heart of the whole plant. The dehullers are designed and manufactured in several varieties depending upon seeds in order to have maximum dehulling with minimum damage to kernels. The most suitable design of rotors, their speed, drive arrangement, feed mechanism etc. are decided after several test-trials in pilot plant dehuller, which ensure best possible performance for particular seeds.

After dehulling, hull separation is an equally important operation. The hull separator has to employ the most suitable air classifier considering terminal velocity of hulls and kernels. Since there is wide variation in particle sizes in the dehulled material, it becomes a matter of experience to select suitable air separators.

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# New Dimensions in Cullet Processing

by

G.C. Singhal and D.P. Rane

Rathi Industrial Equipment Co. Ltd., Pune - 411 005

The demand of glass container manufacturers for contaminant free cullet is justified as contaminants create an immense loss of quality in the finished product and damage the production system (furnace and so on).

Inclusions in the finished product such as aluminium, ceramic, porcelain and stones result in a loss of quality and breakage of the finished product.

Lead results in damage to the furnace bottom with a possible melt-through, as well as shorts between electric heating elements. Even the smallest percentage of ferrous metals as well as off-colour cullet results in unacceptable colour changes in the finished glass. For example, if there is just 0.4 per cent of green cullet in white glass then a chemical colour correction is no longer possible.

Leading recycling companies have adapted to the stringent quality requirements of the glass container manufacturers and use metal, contaminant and off-colour separators made by S + S. In Germany, two-thirds of all cullet is processed with S + S equipment.

## Principle of operation of the S + S metal and contaminant separators

The principle of operation and the integration within the cullet processor is the same for all S + S metal contaminant and off-colour separators. The cullet material is fed using a belt conveyor to a vibro-chute which in turn spreads it evenly over a 45° slider bed.

The sensors are used to detect the respective contaminants. In the control unit microprocessors calculate the exact position of a contaminant particle and activate the air jets by way of magnetic valves at exactly the right time and position. These blow out the contaminant particle within a couple of milliseconds. The good material continues to flow undisturbed.

## The all metal separator MAG 4000

All magnetic and nonmagnetic contaminants larger than 1mm are detected and separated.

Depending on the working width the throughput volume is up to 30 tons an hour.

Even the smallest metallic contaminant creates a change in the high frequency field which is transmitted by a multichannel search coil.

The division of the search coil into 30mm segment guarantees the exact location of the metal particle. The very fine 15mm wide air jets guarantee minimal cullet loss (less than 1 per cent). 99.9 per cent of the metal contaminants are separated from the cullet stream. Across Europe more than 60 machines of this type are operating successfully. This corresponds to a yearly throughput of 2.5 million tons of cullet.

## The contaminant separator LAG 7000

Laser beams scan the cullet stream. All nontransparent contaminants such as ceramic, porcelain and stones larger than 4mm are detected and separated with controlled activated air jets.

At a working width of 1024 mm, 256 laser detectors create a kind of light curtain, which guarantees optimum detection. The high light intensity of the laser beams together with a special electronic filter system developed for this purpose, avoids false separation caused by dirty cullet or paper labels. The loss of good glass can therefore be reduced to 2 per cent.

The maximum throughput at a working width of 2m is 20 tons an hour. This process removes 97 per cent of the contaminants. More than 60 machines have proved themselves by operating at leading European cullet processors.

## The off-colour separator FAG 8000

After a development time of two years and a six-month test run at a customer's site, the off-colour separator FAG 8000 is now in production.

In the manufacturing of container glass, a substantially higher amount of cullet can be used by utilising the off-colour separator. This means a substantial reduction in production costs combined with the highest colour purity and is especially important in the production of flint glass.

The detection principle has substantial advantages compared to common systems

Ultra-efficient lasers send out a bundled multicolour laser beam, which is coupled over fibreoptics via a polygon scanner into a parallel array of 300 transmitter optics. The diameter of the transmitter optic is 4mm. This results in a working width of 1200mm. Opposite the transmitter optic are 300 detectors which are arranged to be in parallel.

The cullet flow arrives from a vibratory feeder to the off-colour separator. The cullet enters the scanning area over a 45° slider bed with a speed of 2m/s. The sharply focused and extremely intense multicolour laser beam transmits through the cullet flow (transmission principle). The laser beams penetrate through each cullet piece every 2mm when it falls through the scanning area.

The remaining light is collected in the receiver optic and is separated into its three principle colours by standardisation and an integral process. Exact colour detection is still possible even if the light intensity is strongly reduced (cullet of great thickness). The off-colour can be detected independent of the light intensity.

High-speed microprocessors in parallel operation with a computing capacity of 16 MIPS evaluate the colour and activate the air jets, which are arranged directly under the detection coil. Off-colours are safely and selectively separated.

The FAG 8000 off-colour separator has the following performance characteristics:

- All off-colours can be separated
- Throughput rate at a working width of 1200mm is 12 to 15 tons an hour
- Able to sort cullet from a size of 4mm
- Even cullet covered with labels can be detected with certainty, because of the transmission principle
- All nontransparent contaminants like porcelain, ceramic and stone are also separated, and
- The off-colour separator is not susceptible to dirt, dust or changes in temperature.

## The fully automatically sample analyser PAG 4171

With the fully automatically sample analyser PAG 4171 you are able to conduct



an exact quality control of the cullet process. It can be used as a quality control for the outgoing cullet at the cullet processor or for the quality control of the incoming cullet at the container manufacturer.

With this system you are able to analyse the remaining contaminant content (metal and nontransparent) and monitor it with a PC by way of a serial port.

Electronic scales calculate the sample weight ( $\pm 1g$ ) and the weight of the rest contaminant ( $\pm 0.1g$ ) and transfer this data to a PC by way of a serial port.

The PC allows you to keep track of and change the operational parameters of the MAG 4000 and the LAG 7000. In addition,

you can handle customer - specific information and have access to statistical information and long-term performance documentation (management information).

All relevant data can be printed (test certificate). S+S offers partial optimisation on complete systems.

In India this recycling technology will definitely be useful as many companies are coming forward not only in glass, but also in plastic, paper, synthetic, fibre etc.

#### 1. Acknowledgement

The authors sincerely thank Rath Industrial Equipment Co. Ltd., Pune for all assistance and kind permission to publish

this article.

Our indebted thanks to S+S Metallsuchgerate Und Recyclingtechnik GmbH, Germany for giving us technical details and assistance.

#### 2. Bibliography

1. Metal Detectors in Plastic Industries. By G C Singhal and D P Rane, published in "Indian Rubber and Plastic-Age": in March - 1995
2. S+S Metallsuchgerate Und Recyclingtechnik GmbH product write-up published in Glass Production Technology International - 1995
3. Internal datas of
  - a) Rath Industrial Equipment Co. Ltd.
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# Cancer Preventive Foods

by

A.K. Srivastava and Y.K. Jha

Department of Food Science & Technology, G.B. Pant University of Agri. & Tech., Pantnagar (Nainital) - 263145

Cancer is one of the greatest problems facing mankind. The incidence rate for all types of cancer in the world is 143 per lakh per year (W.H.S.A., 1987). In India, 15-20 lakh cancer cases have been reported and about 5 lakh new cases occur every year. The mortality rate is very high being almost 3 lakh cancer deaths every year.

Over the past decades, specific relationships have been reported between dietary component and cancer. The higher incidence of cancer due to heavy and prolonged consumption of alcohol, chewing and smoking tobacco is well established. About half of the total cancer among Indian males responsible for causing cancer and about one fifth of the total cancer among females are tobacco-related. Some others dietary risk factors are salted pickled foods, mold contamination, high fats saturated and poly unsaturated lipids), some nitrate containing vegetables, brominated vegetable oil, artificial flavour, colour and aromatic compounds (Weisburger, 1991).

On the other hand, certain vegetables, grains and fruits may be helpful in preventing cancer. The National Cancer institute (NCI) diet and cancer branch has started to develop processed foods, supplemented with food ingredients naturally rich in cancer preventing substances. The studies have shown that fibre, Vitamin A, C and E and numerous other substances appear to exhibit cancer preventing properties (Yellow green vegetables, cereal fibres, monosaturated oil or low fat diet and more protein containing fruits). Cultured milk and milk products have also established role in cancer prevention (Goldin et al., 1984).

Phytochemicals which are present in most of the foods and ingredients may be responsible for prevention of cancer are biologically active and present only in a small amount in foods. About 14 dietary phytochemicals present in common foods are responsible for blocking biochemical pathways which lead to malignancy in animals. These phytochemicals also play a vital role in preventing human cancer (Cargay, 1992).

Scientists of N.C.I. Diest and Cancers branch have established relationship be-

tween diet and cancer. They have suggested possible cancer preventive foods in their increasing importance as given below

## Increasing importance of Possible Cancer Preventive foods.

Garlic, Soybeans, Ginger, Umbelliferac (Carrots, Celery Parsnips).

Onions, Tea, Turmeric, Citrus (Orange, Lemon, Grape fruit) Whole Wheat Flax, Brown Rice, Solanace, Cruciferous (Broccoli, Cauliflower, Brussels Sprouts).

Oats, Mints, Cucumber, Rosemary Sage, Potato, Thyme, Chives, Cantaloupe, Basil, Tarragon, Barley, Berries.

Phytochemicals is one of the essential components present in common dietary foods, having approximately 14 classes. These components are wholly responsible to cure cancer but exact quantity of its use are yet to be investigated. These phytochemicals may interfere with and

potentially block the biochemical pathways that lead to malignancy in animals. These chemicals may also play a part in preventing cancer in mankind. The phytochemical composition of foods and their biological activity can serve as guidelines in the design and formulation of potential cancer preventing foods. Similarly, changes that are known to occur in the chemical composition of foods during processing or through enzymatic action must also be taken into account.

Fourteen classes of phytochemicals are known or believed to possess cancer preventive properties. They are believed to appear in greatest abundance in the foods and ingredients as given in Fig. 1.

The phytochemicals can block or alter metabolic pathways associated with the development of cancer. A carcinogen can initiate or alter a cell, making it susceptible to

Contd. on Page No. 42

PLANT FOODS PHYTO CHEMICALS	GARLIC	GREEN TEA	SOYBEANS	CEREAL GRAINS	CRUCIFEROUS	UMBELLIFEROUS	CITRUS	SOLANACEOUS	CUCUR BITACEOUS	LICORICE ROOTS	FLAX FOODS
Sulfides	✓				✓						
Phytates			✓	✓							
Flavonoids		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Glucarates		✓		✓	✓		✓	✓			
Carotenoids			✓	✓	✓	✓	✓	✓	✓		
Coumarins		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mono-terpenes	✓				✓	✓	✓	✓	✓		
Tri-terpenes	✓		✓	✓	✓	✓	✓	✓	✓	✓	
Lignans			✓								
Phenolic acids	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Indoles											
Isothiocyanates					✓						
Phthalides						✓					
Polyacetylenes						✓					

Fig 1 - Plant foods showing phytochemicals responsible for cancer preventive.



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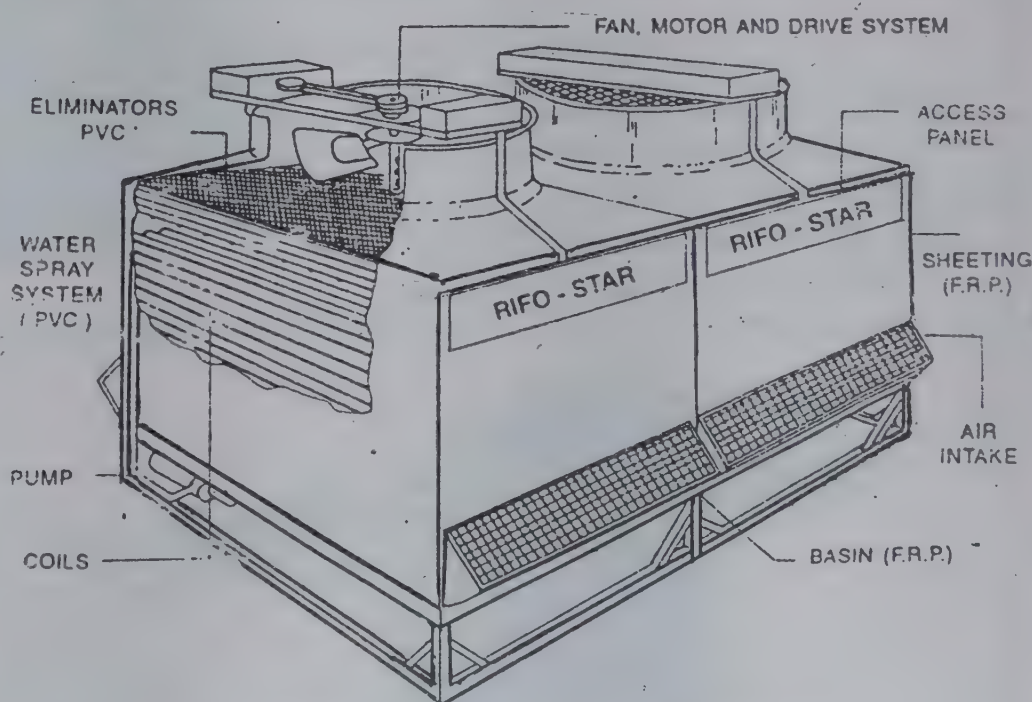
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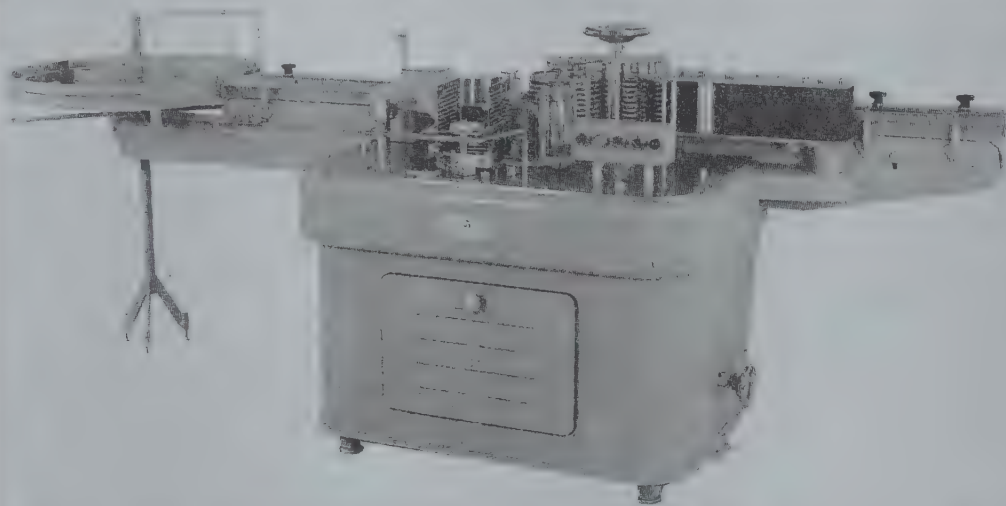
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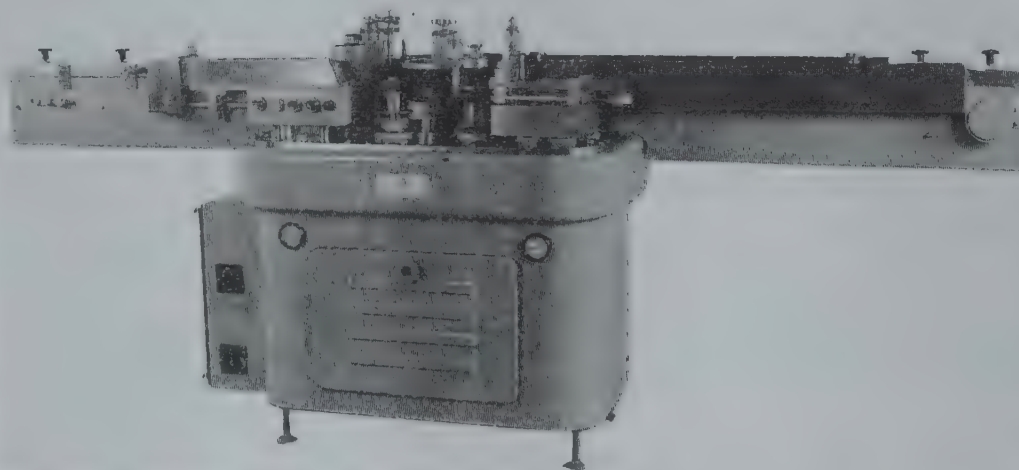
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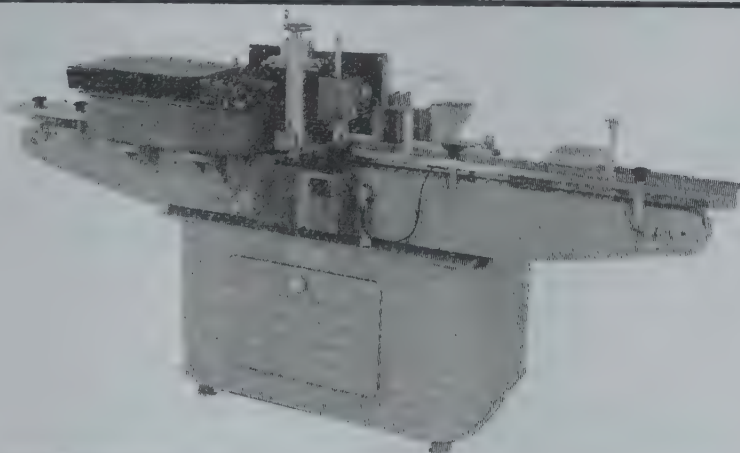
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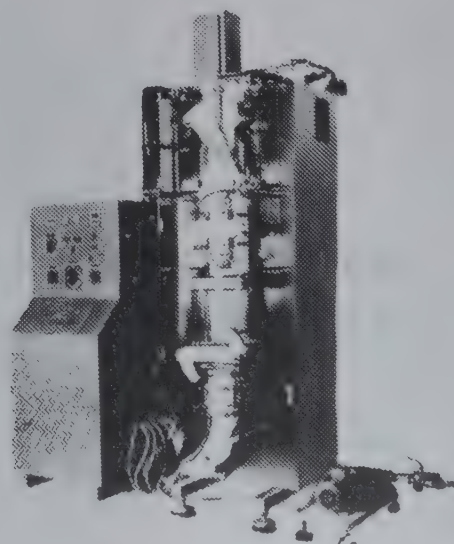


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# Silver Ion Disinfection and its Practical Application

by

Gustav Schmid

Katadyn Products Inc., Wallisellen/Switzerland

## How it started

The bactericidal effect of silver (and other metals) was known empirically from ancient times: silver foils served for wound treatment; and water stored in silver vessels kept its potability over a long period. Documents from the ancient Mediterranean and Asiatic cultures make reference to this experience. Also the Sanskrit literature and the Koran give evidence of it.

The scientific research into this phenomenon dates from more recent times. Pioneering work was performed by the Swiss biologist Naegeli at the end of the last century. A commercially viable process owes its existence to the German physicist Krause; he did research and development work in the twenties and thirties of this century.

Naegeli's scientific legacy was fundamental for the further development of this branch of natural science. The result of his first research was, in brief, the following: a) when pure water in a glass container was brought into contact with clean metallic surfaces (copper coins), it was lethal to the green Algae *spirogyra* in less than one minute, although the mass concentration of the metal was only of the order of  $10^{-8}$  or  $10^{-9}$  gram; b) after removal of the copper coins and drying of the glass container, the latter was refilled with ordinary fresh water; it soon acquired the same lethal properties although it had not been in contact with the metal. This was due to the fact that copper traces adsorbed on the wall had come back into the water.

With equal success, Naegeli investigated the lethal action of silver on bacteria. In view of the extremely low concentrations of metal needed to be effective, he called this germicidal action the "oligodynamic" effect (oligos = small, little; dynamis = force, power).

Krause continued the basic research and discovered that silver even deploys catalytic actions in the disinfection process. He established the term **Katadyn**, a fusion of "catalytic" (German: *katalytisch*) and the already existing "oligodynamic". This term thus implies both the catalytic and oligodynamic properties of silver and has entered the scientific literature. Krause was also concerned with finding methods of adding silver to the water for

practical use. He developed the so-called "contact principle".

## Methods of Silver Admixture to Water

There are basically three methods of adding silver ions to water:

The "contact principle": A neutral substratum exposing a large surface is impregnated with small quantities of silver in the form of a metal layer. Sand, clay, quartz-gravel, silica-gel, earth-ware can be such substratums. A material is thus obtained which releases and dissolves silver when in contact with water.

This was the process used in the early days of silver disinfection in this century, following its development by Krause. He increased effectiveness and shortened contact time by bringing silver into an optimum state of volume/surface relationship. This principle is still applied today for water storage containers have a "silver lining" in this special form. It is also used for filter elements to give them self-disinfecting properties. In the latter application, the actual disinfection of the water is done mechanically by filtration. The contact method is no longer practised wherever a precisely controlled silver release and dose is required.

**Silver salt compounds or silver solutions:** Silver is added manually in tablet, powder or liquid form. Precise dosing is possible. This method is indicated for intermittent treatment needs or small water volumes. The liquid form also permits admixture with a metering pump for large volumes.

Such compounds and solutions are for example sodium silver chloride complexes, silver hydrogen peroxide complexes, silver bromide complexes, silver sulphate, silver acetate or silver nitrate solutions. For tablets, the tableting material can consist of natural water constituents (minerals) to carry the basic silver salt.

**The electrolytic process:** Silver ions are released electrolytically and added to the water as monovalent cations. This process, ideal for dosing, is the practical application of Faraday's Law of Electrochemical Equivalence. It is an easy to operate method, used on an industrial scale and in continuous treatment situations as existing on board ships and plat-

forms.

## "Faraday's Law"

Faraday found that the amperage and the quantity of metal released in the electrolysis are interrelated. Each metal has its own "Electrochemical Equivalent". This is the quotient of the mass discharged (e.g. indicated in milligrams) and of the electric quantity applied (e.g. stated in ampere-seconds).

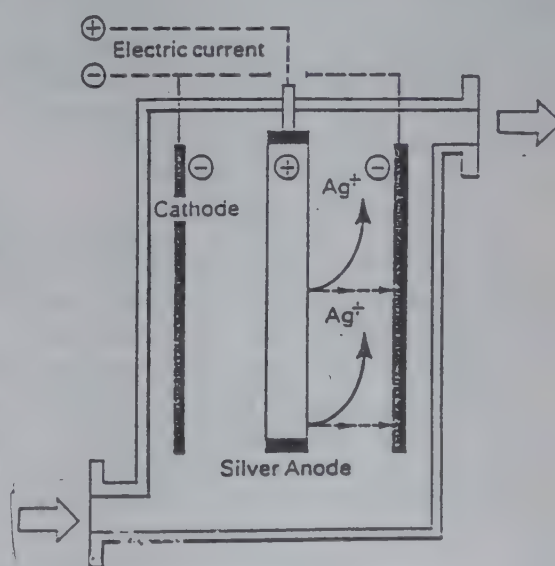
The Electrochemical Equivalent of silver is 1.11817 mg/As. This means that 1.11817mg. of  $Ag^+$  are released in one second at a current of 1 A. For our purpose of controlled silver admixture to water, the following basic rule applies:

**At a charge of 1 mA the  $Ag^+$  release per hour is 4 mg**

Since we are concerned with small concentrations of silver, only low currents are needed. Therefore, values in the milli-ampere range are often sufficient.

## The Electrolytic Process Unit

The design of a unit for the electrolytic process essentially consists of an electrical control and an electrode system. The anodes are of silver. The cathodes may be of stainless steel. The silver release from the anodes is controlled by the amperage setting. The silver ions try to go towards the cathodes but are carried away with the water current. An optimum dispersion of dissolved silver is thus obtained.



Principle of electrolytic silver release



The amperage potential for a given electrode surface is influenced by the electrical conductivity of the water. To design and size a unit, this is taken into account in addition to flow rate and silver dose. A prerequisite to treat low conductivity water (e.g. from evaporators on ships) is a narrow path between anodes and cathodes.

The chemical/physical composition of the water determines the degree of deposits collecting on the electrodes during the electrolytic process. Such deposits have to be removed periodically. Since desalinated water has few minerals, there is little accumulation of deposit in this application.

### Use on Ships and Platforms

**Design and data:** The illustration on page 6 shows the design of an electrolytic silver ion unit, the "Electro-Katadyn" system, as used for marine application and platforms.

The unit is mounted on base board with the control box on the left and the "activator" (containing the electrode system) on the right. Components in the pipeline (from left to right, which is the direction of water flow) comprise: water inlet valve; protective sieve; watermeter; flow switch; regulating T-piece; activation chamber; water sampling tap; and water outlet.

The milli-amperage (shown on the ammeter) is set with the rheostat, based on flow rate and silver dose. The water meter indicates the water through put. Supply of the secondary current to the electrode system is effected by the flow-switch. The circuit is interrupted when the water flow stops. The main switch to operate the unit stays switched on.

Single phase alternating current is sufficient for the electric supply. A rectifier in the control box provides conversion to direct current for the secondary circuit (electrode system). The energy consumption is low, not greater than that of an electric lamp of less than 100 W.

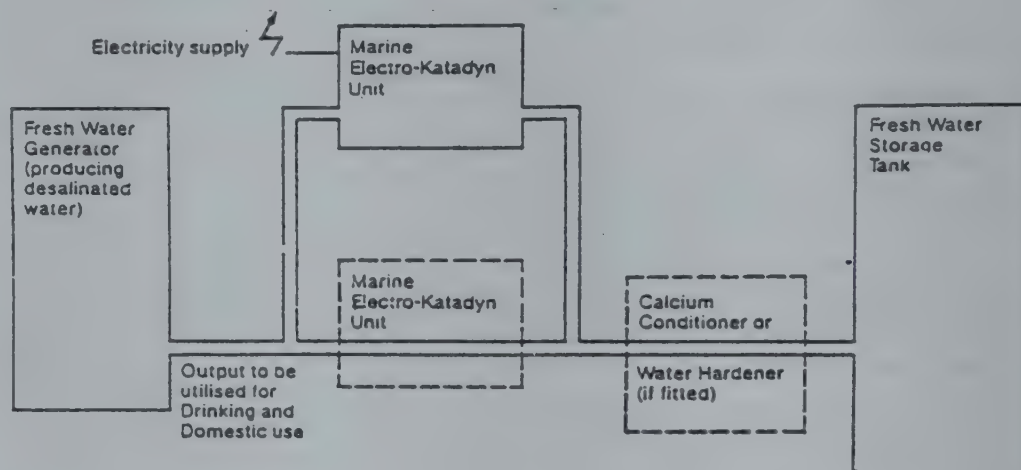
The disinfection system is fully automatic. It features an optical alarm, which illuminates if the power current falls below the threshold value set. A solenoid valve to close in case of alarm may be connected. Furthermore, external optical or acoustic alarms can be incorporated in a central control panel. The corresponding terminals are included in the control box of the silver ion unit.

**Maintenance and spares:** System maintenance or the replacement of the

consumed anodes is simple: the entire electrode assembly is removed as a unit from the activator after unscrewing ring bolts, thereby ensuring easy disassembly. The electrode system is cleaned by brushing or by using a diluted acid-based solvent. Cleaning is a matter of minutes.

The spare anodes require little space and are not subject to aging in storage.

**Installation scheme:** The unit is installed between the fresh water generator and the storage tanks, as shown in this flow chart:



The mineralizer follows the silver ion system. The storage tanks provide the necessary contact time for the silver to act.

**"Part-stream principle":** Where the flow rates are small, all of the water is passed through the silver ion unit. In the case of larger volumes, only a part-stream flows through the unit, where the silver is added in proportionately higher concentration. The required silver dose is reached by subsequent mixing of the water in the pipe. It is therefore possible to handle a wide range of flow volumes without great pressure losses using only few basic unit types (and pipe diameters).

**Properties:** Silver is not volatile and retains its residual effect during extremes in temperature. Temperature conditions as existing on board ships and platforms even speed up the action of silver. Its "oligodynamic" application represents no hazard to health or risk of corrosion to the pipes.

Tank walls and piping systems obtain germicidal properties through silver adsorption on them. If water were added containing no silver ions, adsorbed silver would go back into the water. This is due to the fact that a certain balance between

silver dissolved in the water and silver adsorbed on the walls and pipes is maintained.

### Other Applications

Silver ion disinfection is used in the beverage industry to treat water for production, process or washing purposes. In wine making, silver acts as a catalyst to eliminate wine defects due to sulphur (hydrogen-sulphide taste). In tourism and travelling, silver preparations conserve and purify drinking water. Finally, silver is still applied today for wound disinfection and other pharmaceutical purposes.

*When Replying To Ads.*

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# Importance of all Detector and Separator in Food Industry

by

D P Rane and M S Mandke

Rathi Industrial Equipment Co. Ltd., Pune.

Indian companies have realised the enlarging potential for processed food in India and international market. Spurt in investment in this sector by big industrial houses, from domestic and international market has given boost to new technology in agro based - food, vegetable and fruit products. India already in textile and chemicals etc., will be one of the major exporter in these food processed industry.

In food industry 'product purity' plays an important role and assures quality product to customers. Hence it is essential to deliver food products without dangerous 'ingredients' like metal contaminants. All metal detector and separator is an important part of production or process industry as it removes with certainty magnetic as well as non magnetic metal particles without interrupting the production flow.

## Metal Detectors and Separators in all steps of production

The ideal separator to eliminate metals from bulk material does not exist. A multitude of factors influence the selection of the optimal model type for the individual customer specific production system.

Three criterion are of deciding importance : form and characteristics of the bulk material (for example flow characteristics, electric conductivity), the required detection exactness of the metal contaminant and the throughput volume.)

In general metal detectors and separators are used in all production steps to assure product quality, but also to protect the production machines. As part of the quality control of incoming material they give the manufacturer the assurance that the received raw material can be processed being free of metal contaminants.

Detection in later production steps, for example when different bulk material are already mixed has the advantage that various materials can be examined cost efficiently with one metal detector.

Quite often food is checked for metal contaminants when it is already packaged and ready to be delivered to the customer. At this point additional contaminations are quite impossible.

Detection is only possible if the packaging material itself does not contain any metal (for example : metal foil bags). It also makes

sense to check the material before packaging if the finished container becomes too big to make metal detection effective.

## Metal Separators for Vacuum and Pressure Transfer lines

Special metal separators are used to check good flowing bulk material in vacuum or pressure transfer lines. To guarantee a certain separation with these normally high throughput systems the detection coil, the separator and the evaluation electronic has to be matched to the conveyed material. Because of the high conveying speed the required distance between the detection coil and the separator is longer than in a free fall application.

Also the loss of good material during separation is higher than in similar free fall applications, since the separation time has to be longer to assure certain separation.

## Metal Separators for slowly downwards moving material columns

Other metal separators for well flowing bulk material can be installed directly on top of the production machine because of their low overall height. This way it is possible for the granulate to get into an extruder without any metal contamination, depending on the application the separation is done with a venturi valve or a ramp. The venturi valve has the advantage that there are no moving parts and virtually no maintenance.

## Metal Detectors and Separators for belt conveyors

Bulk material, packaged or not well flowing (sticky) are checked with metal detectors and separators built into belt conveyors. In the food industry mainly closed types of tunnel detectors are being used which are able to guarantee optimal metal detection even with large product heights. The already mentioned product effect can be 'blended out'. The separation system is most likely customized. For example if in the receiving department in a bag of spices a metal is found, the belt drive is reversed so that the contaminated bag can be removed by hand. If the metal detector is part of a complex production system which can not be interrupted a more complex solution for an automatic separation system is required. Depending on the application telescopic belt conveyors, pneumatic push off or wipers and air jets are being used.

## Conclusion

There are metal detectors available for all production steps and conveying systems in the food industry.

## Acknowledgement

We sincerely thank Rathi Industrial Equipment Co. Ltd. for their valuable support and giving us permission to publish this article.

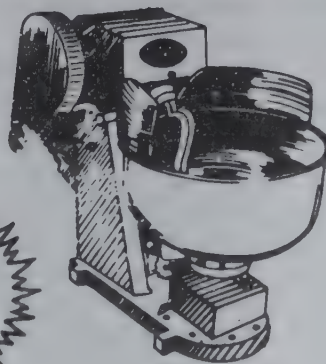
## Reference

- 1) Technical data from collaborator S+S
- 2) Technical data from RIECO -Pune

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# Investment Opportunities in India

*India is set to integrate with the world economy. With new economic and trade policies, ample manpower and raw materials, a huge market with the world's largest middle class, and numerous incentives for foreign investors, she is fast on the track to doing so.*

Today, the business environment in India is dynamic and exciting. Many changes are fast taking place following the entry of many foreign investors.

With a huge population of 900 million, India is the second most populous country in the world. A serious cause for concern is created as the figure continues to grow at an alarming rate. By the turn of the century, India's population is projected to increase to 1 billion. By then, about 240 million tonnes of foodgrains will be required to feed the 1000 million Indians. Therefore the Indian government is, in a race against time, fervently promoting the food processing industry so that India will be able to feed all her people in the near future.

**A sunrise industry:** India's food processing industry is labour intensive and harbours great potential of providing employment to more people. Right now, it employs about 18 per cent of the national labour force at an investment of 6 per cent. Largely made up of unorganised small scale units, the industry contributes about 13 per cent of industrial production. The value of processed food products from the primary, secondary and tertiary sectors is estimated at US\$388.23 milion while the value addition due to all forms of food processing is at US\$165 million.

According to the Hindu Survey of Indian Industry 1993, the food processing industry is expected to be "one of the high growth industries of the current decade", given that its gross profit margin is "estimated at 9.3 per cent as against the average of 7.4 per cent for all industries." Because of its relatively high profit margins, the food processing industry has been accorded the 'sunrise industry' status by the Government of India. However, the current per capita consumption of processed foods in India is still very low. Sheng Hwai Nak, of Harlen Fine Foods, who has just set up a 100 per cent EOU project for coconut-based products with Indian Beverages Ltd., has three reasons to account for it. Firstly, he says that Indian consumers have access to loads of fresh foods which they are used to eating. Secondly, many still do not have

the purchasing power to buy processed foods. Lastly, he adds that, for those who can afford to buy processed foods, Indian products have very poor quality and unattractive packaging.

Indeed, India's packaging industry is not developed and they have very low standards. Nitin Iyer, the export manager of Wonderpack in Bombay, India, says that the packaging companies in India are still not used to the hygienic standards maintained in other developed countries. He further adds that "the role of India's

foods in India which will greatly improve the standard of the food processing industry there. The joint venture project between QAF Ltd in Singapore and Kwaliti Ice Cream Group is a good example. They are bringing QAF's well-known Gardenia brand into India. The move is made mainly because of the emergence of a middle class which will lead to increased consumption of processed foods. Asked if their bread will sell in India, a confident Alvin Chai, corporate affairs manager of QAF Ltd, replied yes. He says that Indian consumers will be receptive to their Gardenia bread as

Composition of the food and beverages sector				
Industry name	Value of output (Rs. million)	Percent of total of total	Value Added of Food and Beverages (Rs. million)	Percentage of total
<b>FOOD PRODUCTS</b>				
Dairy Products	26380	10.7	2180	5.5
Canning & Preservation of fruits & vegetables etc	3860	1.6	390	1.0
Grain Mill Products	5570	2.3	3320	8.4
Bakery Products	6100	2.5	1110	2.8
Refined Sugar	55000	22.4	11020	27.8
Vanaspati	22230	9.0	1180	3.0
Edible oils	28060	11.4	1400	3.5
Tea	20340	8.3	3680	9.3
Animal feeds	4370	1.8	320	0.8
Food products not elsewhere classified	7550	3.1	122	0.3
<b>Total</b>	<b>179460</b>	<b>73.1</b>	<b>24722</b>	<b>62.4</b>
(Recent figures on fish products, indigenous sugar and gur, cashewnut processing and starch are not available)				

food packaging industry is limited because the industry is comparatively small and scattered in small scale units."

**Societal changes leading to increased processed foods consumption:** Fortunately, the low per capita consumption of processed foods will not remain a fact for long. The demand for processed foods is starting to increase due to the changing demographic, sociological and environmental factors in India. Such factors would include the emergence of nuclear families, the growing number of working women, and a new and young middle class of approximately 250 million people who are all very interested and willing to buy. They are more quality-conscious and aware of the food market. With a greater purchasing power, they are demanding for more processed, semi-processed and ready-to-eat foods. This has resulted in a number of new joint venture projects for processed

it is soft, fresh and nutritious. He further adds that foreign brand names are still new to Indian consumers but they are slowly acquiring the consumer know-how and taste etc. Therefore, it will only be a matter of time before they will start buying Gardenia bread on a regular basis when they realise that Gardenia is the leading bread brand in Asia. The confidence that QAF projects is a sure confidence booster for potential investors interested in india.

**India stresses agro-processing:** The agro-processing sector is easily seen as the prime area for investment, given that less than 1.5 per cent of agricultural resources are processed into value-added products.

Agriculture is the most important sector of the Indian economy. It contributes about 33.3 per cent of the GDP and accounts for about 64 per cent of the entire Indian work force. Agricultural products



### BEVERAGES & TOBACCO PRODUCTS

Distilling, rectifying & bleeding of spirits	3930	1.6	1140	2.9
Malt liquors & malt water	4790	1.9	930	2.3
Processing of raw leaf tobacco	2820	1.1	410	1.0
Bidi 9470		3.9	2360	6.0
Cigarettes, cigars, cheriots	6720	2.7	2810	7.1
Total	27730	11.2	7650	19.3
(Recent figures on soft drinks and carbonated water and chewing tobacco, zarda and snuff are not available)				

### India's main export items (food industry)

(Value in US\$ million)

	1992/93	Apr-Sep 1992/93	Apr-Sep 1993/94
Agriculture & allied	3,035.3	1,338.3	1,846.1
— tea	335.8	158.1	164.5
— tobacco manufactured	40.6	14.3	16.3
— oil meals	531.2	190.1	301.9
— sugar & molasses	37.1	21.5	46.5
— processed fruits & juices	42.9	21.7	23.7

Source: Director General of Commercial Intelligence & Statistics, India

### Value of exports from Agricultural sector vis a vis total exports

(in US\$ million)

Year	Exports from Agriculture and allied sector	Percentage of total exports	Total Exports
1990-91	3521	19.41	18143
1991-92	3338	18.68	17865
1992-93	3265	17.61	18537
1992-93 (Apr-Sep)	1338.3	15.68	8534.6
1993-94 (Apr-Sep)	1846.1	17.83	10351.1

Source: Economic Survey, 1993-94

account for nearly 43 per cent of the national product. Coupled with all these is the fact that agricultural operations take up 55 per cent of the total geographical area of India or about 181.5 million hectares.

Dr. M.H. Bala Subrahmanya, senior executive at The Associated Chambers of Commerce and Industry of India (ASSOCHAM), said that "commercial exploitation of the existing potential of agro-processing industry is yet to take place in Indian economy." He also commented that the small scale units in the agro-processing industry cater mainly to local markets and use obsolete technology. This has to change because, as he added, "small scale of operations, obsolete technology and insufficient infrastructure obstruct the development of agro-processing industry as much as they obstruct the development of agriculture." For this reason, ASSOCHAM is insisting on the enactment of the Agricultural Policy Resolu-

tion in India's Parliament. This resolution emphasize the importance of developing infrastructure and research & development in raising productivity and promoting links between agriculture and industry. With this, we see that the Indian government is actively involved in building up their country. They strongly encourage foreign investors to go into the

agro-processing sector as the development of the sector would mean that value will be added to agricultural produce and wastage of the produce will be reduced at the production level.

**Things to look out for:** Despite the many incentives offered by the government and the investment opportunities that abound in the food processing industry, some companies are hesitating to invest in the Indian market. This is because investing in India may not be a bed of roses all the time despite the tremendous physical support given by the Indian government. There are potential problems lurking in the background such as the central government's debt which reached 66 per cent of GDP in fiscal 1993. That meant that more than half of government revenues had to go to interest payments. India's budget deficit was then driven to 7.3 per cent. India is now in the midst of an internal debt trap. At the rate it is going, it is expected that, by the year 1997-98, 100 per cent of the government's revenues will go to interest payments.

There are also other deterrents in the market. An example would be, as Sheng suggests, the prejudice against Indian made goods. In general, consumers do not look too highly on Indian-made processed foods. Thus, they may not want to buy any 'Made-in-India' products at all. Sheng attributes this to the poor quality packaging that they have. For example, the cans are of very poor quality and the labels are very unattractive. For their upmarket products, Sheng will not use the Indian-made cans. On an optimistic note, he adds that investors should not be too worried about the prejudice because if the quality of the product is very good, consumers will not be too bothered about where the product comes from.

Another serious deterrent may perhaps be the country's restrictive labour laws. Companies in India need to get permission from the government to be able to lay off workers or to close down a factory. The

### Steps taken by the Government to promote agricultural exports

- \* Benefits available under scheme of 100 per cent EOUs and EPZs extended to exporters in agriculture, animal husbandry, floriculture, pisciculture and the poultry sectors
- \* Aquaculture EOUs not subject to physical bonding
- \* Import content of farm products is extremely low as compared to non-farm exportables. Exchange rate convertibility on trade account has enabled many of the farm based products such as rice, wheat, fruits, vegetables, to become internationally competitive.
- \* Minimum export price on basmati rice, pepper, guar gum, orchids and meat of sheep, goat and buffalo removed.
- \* Exports of mustard seeds and rapeseeds allowed against quota
- \* Exports of wheat products decontrolled
- \* Exports of milk products decanalised.
- \* Cess on sugar exports waived

Source: "Globalising Indian Agriculture: Policy Imperatives" prepared by Dr. M.H. Bala Subrahmanya, ASSOCHAM



problem is that the government rarely gives such permission. Some companies get around this problem by offering their workers a substantial sum of money as compensation which may be equivalent to a few month's pay. Chai has also cited the country's very strong labour unions as a potential problem. Fortunately, looking at India's growth potential, this problem is not truly a serious cause for concern.

Nevertheless, to add to the above mentioned problems, there are some other major things to look out for, when doing business in India. These are infrastructural inadequacies, the slow legal process, procedural or bureaucratic delays especially at the lower levels, vendor skills and lastly, employee motivation and flexibility. Sheng says that, because jobs in India are hard to come by, Indian workers are generally very hardworking. The only negative aspect is that they are not very motivated. They tend to take their own time to do work and are not aware of urgency in work. Employers need to inculcate a sense of urgency in their Indian employees. Sheng also adds that India is a very big country, with a very big bureaucracy. Therefore, it takes some time to get things done. "You have to get to the specific places to get things done." For example, you have to travel to New Delhi where the government bodies are, to get approval from the central government. If we understand the structure of the bureaucracy, it will be much easier to work around it. Also, individual states vary in their attitudes toward foreign investors and that might affect the process and time taken to get things done.

### The different sectors of India's food processing industry

**Fruit and vegetable processing industry:** India is the second largest producer of fruits and vegetables in the world. At the end of 1993, the installed capacity of the fruit and vegetable sector stood at 1.26 lakh tonnes. It is expected to increase further up to 20 lakh tonnes by the end of the Eighth Development Plan. However, till recently, the fact remains that India only processes less than 1.5 per cent of its total produce.

India has about an approximate 0.4 per cent share of the total world trade of fruits and vegetables. Major items that are exported from India include fruit pulps, juices, jams, pickles, chutneys, canned fruits and vegetables, concentrated pulps and juices, dehydrated vegetables, frozen fruits and vegetables, frozen pulps and freeze dried products.

In 1991-92, the export of processed

Market potential				
(Rs. billion)				
	Preserved fruits/vegetables		Fresh fruits	
	1991-92	1997	1991-92	1997
Domestic	13	30	-	-
Exports	2	5	2.38	10

Profile of Indian fruits & vegetables exports			
(Rs. million)			
Products	Export Performance		1992-93
	1990-91	1991-92	
<b>Fresh fruits &amp; vegetables</b>			
Onions	909	1495	1730
Fresh Vegetables	175	257	220
Dried fruits & nuts	19	361	480
Fresh mangoes	312	360	360
Grapes	86	120	216
Other fresh fruits	12	240	267
<b>Processed fruits &amp; vegetables</b>			
Dried & preserved vegetables	407	640	870
Mango pulp	217	380	583
Pickles & chutneys	128	263	286
Other processed fruits & vegetables	226	296	430

Source: APEDA & Directorate General Commercial Intelligence & Statistics (DGCI & S)

fruit and vegetable products was valued at US\$51.08 million. In 1992-93, it has increased to a value of US\$70.22 million. The figures could have been very much higher, had it not been the fact that each year, about 30 per cent of the total produce go to waste at the farm level. In monetary terms, this 30 per cent amounts to a hefty US\$970.59 million. And all this waste is due to a lack of processing and storage facilities, inefficient and expensive transport facilities, poor harvesting and non-remunerative price available to the cultivators. It is because of this huge amount of waste that this sector is generally considered most in need of foreign investments.

**Poultry and meat products:** India's poultry and meat products industry is growing. Present exports of poultry meat is worth about US\$40,000 per annum, adding up a 24 tonnes. By 1994-95, India's exports of frozen poultry and poultry products are expected to reach US\$7.5 million. As for meat products, exports have been growing rapidly.

India has one of the largest animal populations in the world. Thus, the meat products sector holds a lot of potential but unfortunately, India has not been able to make good use of that because of very little processing and storage infrastructure. Dr. A.K. Mukherjee, the director general of health services in India, has stressed the importance of food processing in a speech he made some time ago. He is reported to have said that though buffalo meat forms

the bulk of food exports, the inadequacy of exports is due to a prevalence of diseases and a lack of modern processing houses. Most of the 3,600 slaughter houses in India are plagued with problems of poor water supply, insufficient electricity/processing facilities and even a lack of carcass removing facilities. There is still much to be done to improve the status of this industry, considering that there are also other problems such as bad feeding. For a start, the Union Food Processing Industries Ministry has formulated 8 schemes with an outlay of US\$130.14 million to augment production, distribution and exports of processed meat.

Finally, it is to be noted that a major problem in this sector could be that cattle are considered sacred animals in quite a few areas in India.

Exports of meat & prepared meats	
(US\$ million)	
Year	Amount
1991-92	74.70
1992-93	83.23
1993-94	112.17

Sources: World Trade Review: Sep 1994

**Fisheries:** This sector is a thrust area for exports. India, being the seventh largest fish catching country in the world, wants to increase its export of seafood. In the financial year 1993-94, India exported approximately US\$800 million worth of



seafood. The projected seafood export figure for 1994-95 is at approximately US\$984 million. Most of the projects that have been set up recently or are being set up in the industry now are for the export market. The top five largest export markets for India's seafood are Japan, USA, Europe, China/Hong Kong and Singapore.

Frozen shrimp is the principal item exported from India. It accounts for about 71 per cent of India's export earnings from fishery products in the year 1993-94. In the same year, frozen shrimp exports increase by 16.33 per cent in quantity and 50 per cent in value from the previous year.

#### Marine product exports from 1989-90 to 1993-94

Year	Qty. (tons)	Value (Rs. Cr.)	Increase/Decrease in relation to previous year			
			Qty	Percent	Value	Percent
1989-90	110843	634.99	+11066	+11.09	+37.14	+6.21
1990-91	139419	893.37	+28576	+25.78	+258.38	+40.69
1991-92	171820	1375.89	+32401	+23.24	+482.52	+54.01
1992-93	208602	1767.43	+36782	+21.41	+391.54	+28.46
1993-94	243960	2503.62	+35358	+16.19	+736.19	+41.56

Source: Seafood Export Journal

#### Export of frozen shrimp & share of total marine products export (in percentage) from India during years 1993-94 & 1992-93

	Qty	Share	Value	Share
1993-94	86541	35.47	1770.73	70.73
1992-93	74393	35.66	1180.26	66.78

Source: Seafood Export Journal

Other items that are exported from India include frozen fish, squids, cuttlefish, and lobster.

Investment opportunities abound in aquaculture development including shrimp hatcheries, fishing for tuna and cephalopods, and processing value added products. The growth potential is great as there is abundant natural resources. However, shrimp capture fishery has been fully exploited. Therefore, the government is encouraging shrimp farming which holds

excellent potential for growth. To promote shrimp farming, the Marine Products Exports Developing Authority (MPEDA) is offering help in site selection, feasibility study, pond preparation and management, and harvest. G. Rajan Nair, managing director of Poyilakada Fisheries Ltd. a major processor and exporter of frozen marine food products in India for the past 20 years, says that India only started the large scale prawn culture very recently. The industry is therefore not very developed yet. It holds tremendous potential as it is expected that cultured prawns will become a significant portion of the raw seafood supply in the near future. He also adds that the change in the position of the seafood industry in India (as she now exports value added seafood products) has created much scope for further value addition and diversification.

India's sea fisheries resources, with the exception of shrimp, have been underexploited because of the lack of modern fishing craft and equipment and of processing facilities. Therefore, foreign investment in the seafood processing industry is greatly encouraged as it would lead to the modernisation of the processing facilities which will in turn lead to waste reduction, quality improvement and value addition.

**Dairy Sector:** Milk and milk products have also been an important part of the average Indian diet. Milk production in India caters mostly to the domestic market though the situation is fast changing. India is the world's third largest producer of milk. Current milk production stands at 58 million tonnes. The production volume is projected to hit 68 million tonnes in 1995. By the year 2,000, it is projected to reach 90 million tonnes. Currently, India exports US\$7 million worth of milk products. This figure is expected to increase to US\$10 million in two years' time and subsequently US\$100 million in five years' time.

time.

There are a few large multinational corporations such as Glaxo, Nestle and Smithkline. These corporations do not have a large share of the market as the dominant position in milk and milk products manufacturing and marketing is occupied by the cooperative sector. There are presently more than 64,000 cooperative sector dairies. They have market shares of more than 75 per cent in butter, 74 per cent in cheese and 55 per cent in milk powder. Each day, they handle more than 10 million litres of milk. Right now, they are expanding their milk handling and processing capacities. By 1996, they would have a total milk processing capacity of 20 million litres a day.

**Grain processing:** India's basmati rice commands a premium in the world markets. Being the second largest producer of rice and wheat in the world, India produces and consumes 22 per cent of the world's rice. She also exports around half a million tonnes of rice every year. As the demand for packaged or ready-to-eat foods increase, there will be more large scale investments in this sector which is largely unorganised. Investment opportunities exist in the production of value added products based on pulses like gram and coarse grains like maize. There is also considerable scope for increasing edible rice bran oil production as the premium oil has export potential.

The newest development in this sector is that the Indian government has recently

#### Food grains production in recent years

Crop	(in million tonnes)				
	1989-90	1990-91	1991-92	1992-93	1993-94
Rice	73.6	74.3	74.7	72.6	74.0
Wheat	49.8	55.1	55.7	56.8	56.9
Coarse Cereals	34.8	32.7	26.0	37.0	33.7
Pulses	12.8	14.3	12.0	13.6	14.5
Total food grains	171.0	176.4	168.4	180.0	179.1
Yield per hectare	1349	1380	1382	1445	-

Source: Economic Survey 1993-94

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abolished the minimum export price realisation on sale of non-Basmati rice. Before, such rice could be exported provided the price was at least US\$200 per tonne.

**Beer and alcoholic beverages** The demand for beer and alcoholic beverages is high and growing at a significant rate that is unmatched by the supply. Therefore, it would seem that investing in this industry would be a very attractive option. But the down side is that this industry is beset with various hindrances. It is subject to heavy taxes, compulsory licensing, restrictions on advertisement and control over its principle raw material - molasses, a by-product of the sugar industry. The government has banned the creation of additional capacity for the making of potable alcoholic drinks from molasses. The ban does not, however, apply to potable alcohol and alcoholic drinks that is made from other raw material such as barley, hops, maize and yeast which are abundantly available in India. Furthermore, restrictions are placed on the inter-state movement of the beer and alcoholic beverages. There are also some state government who control the distribution of beer and alcoholic beverages.

Currently, there are about 35 breweries located in various parts of the country, with a total licensed capacity of 50 hectolitres or 5 tonnes per annum and 212 distilleries with an installed capacity of 1,933 million litres per annum.

Liquor made in India is classified into country liquor, Indian Made Foreign Liquor (IMFL) and beer. IMFL production primarily comprises of wine, whisky, rum, vodka, gin and brandy. These are only high income groups.

Imported beers are scarce in India. Therefore, local brews are popular, especially the stronger ones. The most popular Indian beer, Kingfisher Lager, is brewed in the capital of Karnataka, Bangalore, which is known as the beer or pub capital of India. Kingfisher is owned by United Breweries (UB), the biggest player in the US\$324 million Indian beer industry, with a market share of around 40 percent. The other major players Mohan Meakins and Shaw Wallace, with market shares of around 20 per cent and 8 per cent respectively. Right now, the per capita consumption of beer is only half a litre. This shows that there is a huge potential in the beer industry. However, it is to be noted that it costs about US\$6.47 million to set up a reasonably-sized brewery. In addition to that, the fact remains that beer consumption is presently, to a very large extent, limited to the cities and towns. With 75 per

cent of India's population living in villages, this means that the beer market is only limited to 25 per cent of the population.

In general, the demand for beer and alcoholic beverages in India is growing quite significantly despite the high prices.

**Other packaged foods and drinks** Indian consumers are more receptive towards packaged foods and drinks nowadays. The demand for packaged foods and drinks is increasing at a steady rate and there have been many successful product introductions. The sub-sector within this industry with the highest growth potential is the convenience food segment, which is growing at an aggregate rate of 20 per cent. There is significant corporate presence in this industry and many of the bigger MNCs are already in the market. Below are the update on the 6 product groups in this sector.

**Confectionery, chocolates and cocoa products:** There is a large range of cocoa and non-cocoa based confectionery items produced in India. However, the production of confectionery items other than chocolates is reserved for the small scale sector. The small scale and cottage sectors cater to the semi urban and rural areas while the organised sector caters to the urban areas and the export market. A few big companies such as Cadbury India Ltd, Nestle India Ltd, Procter and Gamble India Ltd and Nutrine Confectionery Ltd have long established their presence in this sector, which is expected to grow steadily in the coming years.

**Soft drinks:** Though soft drinks are generally still considered a luxury item in India, the market for it is big. It is currently worth about US\$355.8 million and estimated to be growing at a rate of some 10 per cent a year. There is enormous growth potential here as Indian consumers currently buy an average of only three bottles of soft drinks a year, compared to international standards of around 85 bottles a year.

There are 54 units in the organised sector. The major players are Coca-cola and Pepsi who have started a price war as they fight for the biggest share of the market. Units in the unorganised sector account for an estimated 25 per cent of the total production of soft drinks. In 1991-92, the demand for soft drinks was 5.200 mil-

lion bottles. This demand is projected to increase to 7,360 million bottles in 1994-95.

**Snack foods:** The demand for snack foods is increasing. Consumption is by all classes of the population, though the middle class segment shows the greatest growth potential. Most of the snack foods produced in India are for the domestic market. There is a demand for extruded snacks but the growth rate is very low. This is due to the fact that high pressure double screw extrude systems are currently very expensive in India. However, the consumption rate will increase as more systems will be imported at a lower price under the new liberalised import policy where custom duty rates are reduced.

**Bread, biscuits and other bakery products:** In India, the production of fresh bread and biscuit is reserved for the small scale sector. There are about 55,000 bakery units in India that manufacture biscuits, bread, cakes and other products, of which around 90 per cent is in the cottage sector. Production of bakery products is increasing steadily. By 1997, it is expected to increase to 3.4 million tonnes.

**Ice-Cream:** In general, Indians consume about 85 million litres of ice-cream every year. India's ice-cream market is valued at US\$80 million and confined largely to big towns and cities. It is currently growing at a rate of 10 per cent per annum. The biggest name in this sector is Kwaliti Frozen Foods Ltd, which together with its sister companies, reportedly have a 48 per cent market share of the country's ice cream.

**Semi-processed and ready-to-eat foods:** Today, Indians still prefer to eat fresh foods. But the changing socio-economic factors and lifestyles have resulted in a growing demand for semi-processed and ready-to-eat foods. Many Indian women are joining the workforce and consequently, have less time to cook for the family. They are increasingly turning to semi-processed and ready-to-eat foods to feed their family.

The industry is still predominantly in the small scale sector. But the situation in this sector is fast changing with the recent entry of MNCs such as Kelloggs and Pepsi.

*Courtesy : Asia Pacific Food Industry Jan/Feb '95*

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# Appropriate Post Harvest Technology of Horticultural Crops

by

Vijay Sethi

Division of Fruits and Horticultural Technology, Indian Agricultural Research Institute, New Delhi - 110 012

India is uniquely placed to produce horticultural crops and it occupies a prominent position among the horticulturally rich countries of the world due to its wide range of agro-climatic conditions. The horticultural crops include fruits, vegetable, tomato, roots and tubers, flowers and ornamentals/foilage, mushrooms, betel leaves, plantation crops, spices, medicinal and aromatic plants. Horticultural crops are the reservoir of wealth of India. Being store houses for various minerals and vitamins, they are vital for increasing the income of farmers, generating employment in rural areas and by conserving them we can promote the nutritional status of people.

India is the second largest producer of fruits in the world after Brazil and of vegetables after China with an estimated annual production of over 27 million tonnes and 50 million tonnes respectively. However, less than 1% of the production is commercially processed. Fruits and vegetables are the major source of important vitamins like A, C and B as well as good source of minerals such as calcium, iron, phosphorus, potash etc. and they are very essential part of our diet. Roots, tubers, bananas and plantains are important source of calories and good source of fibre and roughage which again has an important dietary role. In addition fruits and vegetables provide variety, enjoyment, increase appetite and a source of satisfaction with the diet because of their appealing colours, flavours and texture. Horticulture as an industry has not thrived well in our country due to improper harvesting, handling, packing, transportation, storage, distribution and processing. There are net 20-40% post harvest losses. These losses account towards poor return to the growers and increase the cost of raw material which is ultimately affecting the consumers at large. The degree of loss depends on the plant material involved, the prevailing environmental conditions and management of food supply system. Problems in post harvest management of perishables are commercially oriented and area specific. In order to reduce the rate of losses we have to make

every effort to strengthen the post harvest management of horticultural crops. Post harvest losses can be reduced to some extent by (i) breeding of fruits and vegetables for longer shelf life, (ii) improvement of preharvest factors and harvesting techniques, (iii) proper methods of post harvest handling, packing, transportation and marketing, (iv) use of appropriate storage technique for extending shelf life, (v) development of appropriate processing technology, (vi) utilization of unmarketable produce and processing wastes into value added products etc.

Agriculture is the key to our economical development, so there is a need for the diversification of agriculture towards horticulture through technological feasible and economical viable methods. In 8th plan, importance has been given to boost horticulture production and processing in India which is one of the most potential areas for increasing agro exports. We have to plan new strategies and action for the integration of women whether they are working as labourers, farmers, researchers, scientists or extension workers in the field of production and post harvest management and processing of horticulture for its development because they form the backbone of plantation agriculture, livestock, production of agroforestry, fishing etc. and nearly 80% of economically active rural women are associated with horticultural production. Women's role in strengthening the post harvest management right from harvest can never be overlooked.

Production of crops is only half the battle. With appropriate harvesting, handling, packaging, transport and adequate storage facilities we can win the other half of the battle. Food production alone cannot offer food security to the population. Wastage of horticultural crops at post harvest stage can be prevented by developing and using low-cost, low energy appropriate processing new and viable simple technologies for sustainable horticulture. By proper planning for domestic and export market, economic revolution can be brought about in horticulture in India. There is a

great scope and potential for agro industries. All future thrusts in research should be aimed at developing simple technologies which could be easily adapted to conserve and preserve perishable commodities and minimising both their qualitative and quantitative losses so that the gap between the production and availability of horticultural crops is slowed down.

In a country like India, where the climatic conditions induce more spoilage and more loss of products, simple technologies which could be easily adopted by farmers, processors, industrialists and retailers etc. can be practicable to minimize some of the existing losses and to conserve the perishable commodities in a proper way. Fruits and vegetables are one of the important horticulture crops and highly perishables. They have to be preserved and processed in glut season for later use. Commercial methods of preservation and processing such as refrigeration, freezing, canning, aseptic packing and processing, or laminate packaging etc. are very expensive and make the product out of reach of the common man. These sophisticated technologies can be adopted for export purposes but for domestic purpose the solution lies in the use of an appropriate low cost technology for conserving and processing them. These technologies will center around low cost cooling system, solar drying, use of total additives such as chemical preservatives, organic acids, salt, sugar, spices etc. pickling and fermentation that will reduce post harvest losses, utilize market surplus, promote horticulture and will give boost to preservation industry, benefit to consumers, better returns to growers and cater to indigenous needs to save the nutritional losses. Some of these simple methods have been developed at Indian Agricultural Research Institute, New Delhi and are described in this paper.

At present thorough screening should be done among the existing cultivars to choose most suitable ones for reducing post harvest losses. Perishable produce must always be handled carefully and gently. They should be harvested at proper



maturity and proper grading and curing and packaging should be carried out to increase their storage and marketability. Perishables can be effectively be stored over different periods under low temperature and high humidity conditions as contained in commercial cool stores. In hot and dry weather prevailing over much of India for a significant part of the year, the use of evaporative (desert) coolers based on evaporative cooling system can be used much more effectively for increasing the shelf life of horticultural crops to some extent.

Processing industry in India has not expanded due to high cost of processed products. In our country low cost low energy processing technologies are needed which should be simple and adaptable in the rural countryside that occupies about 70% of population with limited skills and resources. Solar drying is one of the proper economical and viable methods for preserving fruits, vegetables, mushrooms and other horticultural crops. The quality of the dried products can be improved by proper pretreatments prior to drying and proper

packing of the dried products to keep the processed and preserved products within the reach of major section of the population. In India, low cost, low energy processing technologies are needed. Now one can preserve fruits, vegetables, mushrooms etc. without much cost by steeping preservation technique by the use of a chemical solution containing salt, and, preservatives, sugar, spice oils etc. or by the addition of chemical preservatives and as in the preservation of whole tomato concentrate (crush) and in fruit pulps and juices. Quality of fruit and vegetable pickles can be improved by selecting proper type of raw material, proper pretreatments and by use of acetic acid which acts as antimicrobial agent to check their spoilage by microorganisms during storage. Vegetables can also be preserved by the simple method of lactic acid fermentation in the presence of salt and mustard powder. Lactic acid fermentation method prolongs shelf life, extends seasonal life enhances the organoleptic and nutritional quality of the fermented vegetables, required less time for cooking and sometimes increases acceptability and digestibility of the products. Fermented foods act as laxa-

tive agent. In foreign countries these fermented vegetables (known as fermented pickles) are very popular but in India they need to be popularised.

The horticultural wastes and processing wastes can also provide a good source of raw material in establishing new industries for value added products like poultry and cattle feed, oils, pectin, pigments, vinegar and a variety of other products. Proper infrastructure should be there for saving post-harvest losses.

To give boost to horticulture industry and to make it stand on its own sound footing, there is a need for consumer educational programme that should be carried out by extension workers at farm level to educate farmers and their womanfolk regarding nutritional, microbial and quality parameters for handling various crops and their products which will be of national importance. Strategy should be made to integrate women at all levels of planning, implementation, monitoring and evaluation in stages of development processes for various spheres such as economic, social, decision making and civil status etc.

*Contd from Page No. 28*

### **Cancer Preventive Foods**

cancerous growth. This growth does not occur, however, until one of several factors called promoters act on the altered cell.

In breast cancer, the most common cause of cancer initially in women, these factors (promoters) include oxidative damage, the action of steroid hormones and the action of certain kind of prostaglandins. The mechanism of phytochemicals can affect metabolic pathways associated with breast cancer.

Foods are complex mixtures of various phytochemicals. The specific role of each phytochemical and the potential synergistic effect of different phytochemicals in the

cancer prevention process are unknown. However, the N.C.I. Diet and Cancer Branch has given much emphasis to study, assess and develop 'designer' foods - processed foods that are supplemented with food ingredients naturally rich in phytochemicals.

#### **Garlic:**

Raw garlic cloves contain the phytochemical allin, which is converted to alliin on crushing, which in turn can be converted to allylic sulfur compounds and amino acids. Aqueous alcohol extraction and aging of the extract can help to convert the alliin into less toxic phytochemicals such as diallylsulfide, S-allyl-L-cysteine and S-allyl inercaptocystine. Due to lower relative toxicity of these compounds which re-

tain their antimutagenic and antitumorogenic properties make the aged garlic a more appropriate food for human consumption.

#### **Cultured milk and milk products:**

The importance of cultured milk and its products cannot be ignored. It contains lactic acid bacteria (*Bifidobacteria*, *Lactobacillus acidophilus*, *L. delbrueckii subsp bulgaricus*, *L. jugurti*, *L. casei* and kefir bacteria) for the prevention of stomach, colon and other cancers. It is claimed that cultured milk and fermented milk products suppress the production of carcinogens by the enzyme of intestinal bacteria (notably B-glucuronidase, azoreductase, nitroreductase, and 7- $\alpha$  dehydroxylase) and they remove free radicals and activate the immune system.

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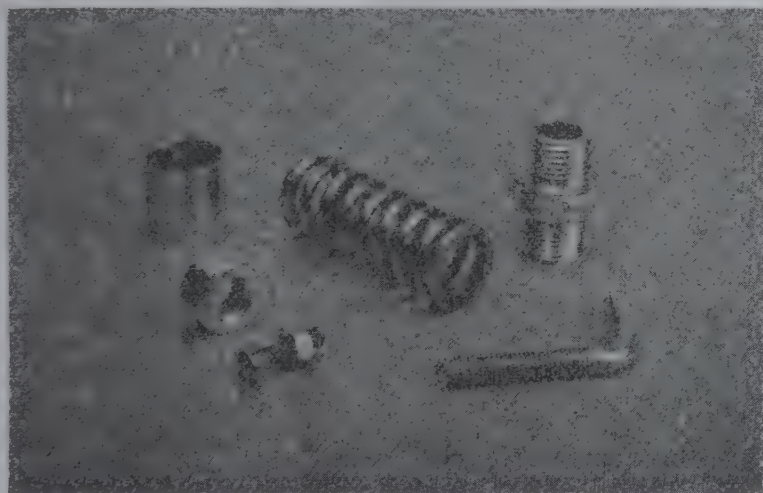
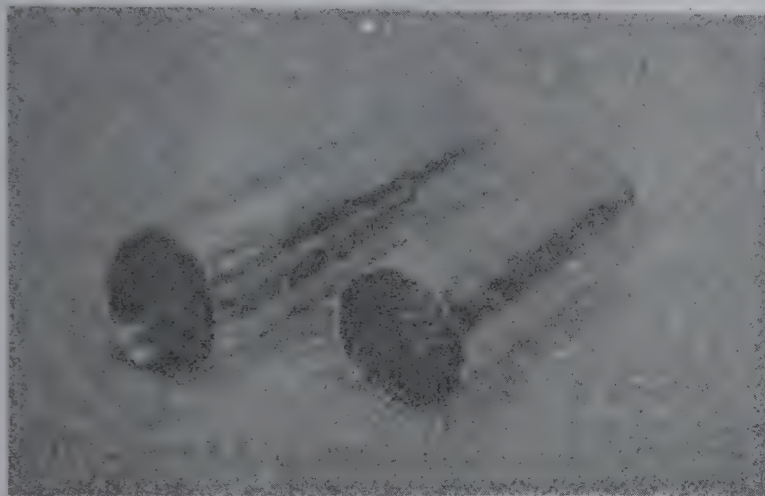
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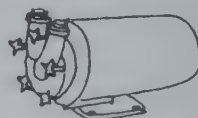
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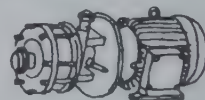
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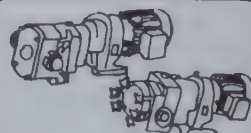
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# Antibiotic and Drug Residues in Milk Products

by

L. Sabikhi and A.A. Patel

Division of Dairy Technology, National Dairy Research Institute, Karnal

Antibiotics and drugs, when employed for the control of infectious diseases in milch animals result in the secretion of their residues into milk. The consumption of such contaminated milk has physiological and technological implications. Cheese and fermented milk industry is greatly affected, owing to the inhibition of lactic cultures in milk containing antibiotic residues. Although heat treatment is not effective in inactivating the contaminants, ultrafiltration and the use of enzymes such as penicillinase helps to decrease the antibiotic load of milk.

## What Are The Antibiotics of Concern ?

Antibiotics and drugs are used in veterinary science to reduce mortality and morbidity from infections, increase growth rates, improve feed conversion, relieve stress or tranquilise, and to improve productivity in general. They have been used increasingly in dairy cattle management since the late 1940s. With milch animals, they are used mainly in the treatment of mastitis, but also in numerous other diseases. Administration of antibiotics and drugs into milch animals, however, result in secretion of residues into milk. Such residues may have implications not only in the safety of human health, but also in processing of the milk. This paper deals with the occurrence of antibiotics and drugs in milk and its physiological and technological effects.

## How do they get into milk ?

Whether administered orally or by injecting, antibiotics are absorbed into the body and transported via blood and extracellular fluids of the body to the site of the infecting organisms and much of the antibiotic dose appears in milk. Similarly, all drugs administered to lactating mammals will appear in their milk. These include caffeine, nicotine, analgesics, sedatives, opiates, ethers and chloroform (Larsen and Smith, 1974).

The passage of the drugs across the mammary barrier appears to be similar to that of drugs through other biological membranes. Most drugs are either weak acids or weak bases, existing both in ionised and non-ionised forms. Their transfer to milk depends upon the solubility and the chemical properties of the material and the

extent of any transport mechanism that may be present for some related material. The pH of ruminant milk is lower than that of blood, so drugs of an acid nature have a higher concentration in blood than in milk. The reverse is true with alkaline drugs (Larsen, 1985).

The quantity of antibiotics and drugs in milk from treated cattle is influenced by (a) the concentration and kind of antibiotic used, (b) the carrier/ vehicle employed in the preparation, (c) the amount of milk drawn from the gland, (d) the time interval between treatment and milking, (e) absorbancy of the udder tissue, (f) milk yield and (g) individual factors (Hamann *et al.*, 1979). The use of higher concentration of penicillin in treatment has been found to result in the presence of the antibiotic in the milk from treated cows for longer periods. Procaine penicillin in oil with added aluminium monostearate extends the period during which penicillin is detected in the milk of treated cows. Highest concentration of penicillin are found in the milk removed from the udder during the first 24 hours after treatment. It is often recommended that milk secreted during 72 hours following administration of an antibiotic or drug may be discarded so as to eliminate most of the residual antibiotic or drug. When cows were treated with 200 mg aureomycin per quarter, the milk obtained after 36 hours following the treatment and in some cases, even 60 hours, was inhibitory to lactic cultures (Hammer and Babel, 1957). There is also some variation in the amount of penicillin secreted by individual cows. Mastitis being one of the most common cattle disease requiring drug administration, it is suggested that the treatment of subclinical mastitis at the beginning of the dry phase is most favourable from the point of view of minimising the contamination of milk with antibiotic and drug residues (Hamann *et al.*, 1979).

In Switzerland, in order to analyse the cause of antibiotic contamination of milk, 2227 cases of contamination occurring from 1986 to 1989 were examined. Approximately 45% of these were due to direct contamination and 55% due to transmission of antibiotic containing milk residues (Schallibaum, 1991). The contamination

was attributed to the non-observance of withholding periods (35%), the order of the cows at milking (29%) and inadequate hygiene measure (20%). Wiesener (1991) reported that of all contaminations, 41% are from the udder (secretory contamination) due to lack of information or ignorance, incorrect milking practice, incorrect treatment and antibiotic-treated dry cows. The rest (59%) are post secretory, due to lack of hygiene and non-separation of treated cows.

## What is the magnitude of occurrence in milk ?

Literature says that 25 to 30 years ago, approximately 50% of the cows in the USA were infected with mastitis (Reid, 1990). Although veterinarians and dairy producers have been using remedial drugs and antibiotics in one form or the other, the level of mastitis is basically the same even today. An obvious lack of caution in management practices and further, the continuing use of antibiotics and drugs have been reported to result in their residues appearing in milk.

Early surveys conducted in the USA in 1951, 1954, 1955 and 1956 have shown occurrence of 6%, 3.2%, 11.6% and 5.9% respectively of milk samples tested from dairy plants and route wagons, the antibiotic present mostly being penicillin (Marth and Ellickson, 1959). A Canadian survey showed that starter cultures were inhibited by 7.3% of 344 herd milk sampled in the summer of 1952. Results from surveys conducted in the UK during 1954 and 1955 showed there was no seasonal trend in the quantity of penicillin in milk. In surveys conducted by the United Dairies Research Laboratories, London, 1.4% of can milk contained penicillin, whereas bulk milk was free from it. The incidence at 0.02 IU penicillin per ml milk was 0.8 to 2.6% and at 0.05 IU/ml level, 0.7 to 0.9%. During the year 1989-90, Florida's Dairy Division (USA) dealt with contaminants such as antibiotic residues, especially of sulphamethazine in the state's milk supply (Boosinger, 1990). An educational, sampling, inspection and enforcement programme was initiated so as to eliminate the residue of this drug. The occurrence of antibiotic residues in milk and milk products in some other countries are illustrated in Table 1.



Table 1 : Occurrence of antibiotic residues in milk products in some countries

Country	Type of sample	Substance present	Magnitude of occurrence	Reference
Poland	Raw milk	Chloramphenicol	9 out of 938	Rybinska and Karkocha, 1992
		Streptomycin	28 out of 251	
	Dried milk	None	None in 215	Krzyzanowski et al (1993)
	Raw milk	Beta-Lactamate based antibiotic	41.1% of 185	
	Market milk packaged by milk co-ops.	Inhibitory substances	21.1-33.3%	
Egypt		Antibiotics	4-4%	
	Raw milk from state farms	Antibiotics	7% of the 43 tested	
Egypt	Raw milk	Antibiotic residues	3.1% of the samples tested	Abou-Donia and Reda, 1992
	Pasteurised dried, evaporated, condensed, sterilised, UHT milk	-do-	None	
Malaysia	Fresh milk	Antibiotic residues	3 out of 66	Salam-Abdulla et al (1991)
	Pasteurised milk	-do-	None in 2	

Table 2 : Defects in Swiss and Edam cheese caused by the presence of antibiotics in the cheese milk

Antibiotic concentration in milk (1000 l vat)	Swiss	Quality of cheese	Edam
<b>Penicillin</b>			
0.003 IU/ml	No defects	---	
0.005 IU/ml	Many small holes, strong off flavour	Tasteless, coloured body	
0.008 IU/ml	Butyric acid fermentation, strong off flavour, pasty body	Bitter, uneven body, wet surface	
0.01 IU/ml	---	Strong off flavour, uneven body	
<b>Spiramycin</b>			
1.0 IU/ml	Smell of butyric acid, off flavour, uneven eye distribution	Tasteless, uneven body, wet surface	
<b>Streptomycin</b>			
1.0 mg/ml	Discoloration, strong off flavour	Strong off flavour, abnormal structure	
<b>Tetracycline</b>			
0.2 mg/ml	Discoloration, off flavour	---	
0.3 mg/ml	---	Tasteless, coloured body	

Ref. Mayra-Makinen (1993).

The incidence of antibiotics in milk in the West has decreased considerably, because of the strict legal measures. The incidence in the USA, for example came down from a previous high of 8% to about 0.5% (Kosikowski, 1982). However, antibiotics and drugs continue to contaminate milk.

### What are the implications of their presence ?

The significance of pharmaceutical antibiotics in milk can be considered from two angles. In addition to the potential

economic losses due to the interference with the manufacture of cheese and fermented milk products, the possibility of a public health risk to individuals needs consideration (Kosikowski, 1982). In the USA, purchasers of bulk milk and powder demand that no antibiotics are present in these commodities. In making assessments, however, it is necessary to differentiate between natural antibiotics which have no public health significance and the heat labile ones which are usually inactivated by heat treatments such as pasteurisation, unlike residual pharmaceutical antibiotics, which are not.

## Physiological and toxicological aspects

Penicillin appears to be most dangerous in this respect, because of its past adverse history in inciting anaphylactic shock, sometimes fatal in highly sensitised persons receiving a medical injection (Kosikowski, 1982). Little information exists about prior quantity of penicillin required to shock a subject anaphylactically after the intake of large medical dose. It is believed that the amounts are extremely small, less than 0.001 IU per ml milk, to trigger this reaction.

From another public health point of view, the presence of pharmaceutical antibiotics in milk may render disease-producing staphylococci resistant after constant exposure, and when clinical control of such bacteria is required, the antibiotic administered medically is ineffective (Kosikowski, 1982).

No direct toxic effects from the ingestion of milk containing antibiotics are reported, because of the low levels present in milk (Hamann *et al.*, 1979). However chloramphenicol, if given in high doses for a long time may lead to aplastic anaemia caused by bone marrow depression. Several sulphonamide-containing drugs that are used as remedies for animal diseases have sulphamethazine as a component. Sulphamethazine has been shown to cause thyroid tumors in rodents (Hill and Smythe, 1991).

## Technological implications

**i) Inhibitory effect of penicillin and other antibiotics :** The rate of growth of lactic cultures in milk containing antibiotics is influenced by the type of antibiotics, the amounts present, and the sensitivity of the culture. Penicillin is 3.3 times as effective against lactic streptococci as aureomycin or subtilin, 6.6 times as effective as streptomycin and 33.3 times as effective as bacitracin or chloromycetin (Hammer and Babel, 1957). A tenth of a unit of penicillin can inhibit lactic cultures and cause widespread damage (Irvine and Hill, 1985). Levels as low as 0.05 IU of penicillin per ml milk slows down lactic acid fermentation perceptibly. Acid development always stops completely at 0.1 and 0.2 IU of penicillin per ml of milk. Acid production rate of *Lactobacillus bulgaricus* and *Streptococcus thermophilus* is adversely affected at 0.02 IU per ml milk or even lower. Aroma production by *Leuconostoc* species is arrested at 0.01 IU per ml (Kosikowski, 1982). The inhibitory effect of penicillin varies from 0.005 IU/ml for *S. thermophilus* through 0.05 IU/ml for



*Lactococcus cremoris* and *Leuconocitrovorum* to 0.35 IU/ml for *Streptococcus durans* (Kosikowski, 1982).

Lactic cultures grown in whey are more sensitive to smaller amounts of penicillin than when grown in milk. When a distinction is made between *Lactococcus lactis* and *Lactococcus cremoris*, the former appears to be more penicillin resistant (Hammer and Babel, 1957).

Cream obtained from penicillin- and streptomycin-containing milk failed to develop sufficient acidity during the manufacture of sour cream butter, and similarly, acidity development was strongly inhibited in the skim milk-spray-dried, reconstituted and pasteurised before inoculation with 2% starter (Hansen *et al.*, 1950). Thus, these antibiotics appeared to be partitioned between cream and skim milk in proportion to the aqueous phase.

An investigation undertaken to develop antibiotic resistant strains of lactic streptococci, i.e., *Lactococcus lactis* biovar, *diacetylactis* and *Lactobacillus delbrueckii* subsp. *bulgaricus* showed that penicillin may have drastic effects on the activities of lactic cultures compared to streptomycin (Babu *et al.*, 1989). However, the amount of diacetyl and acetaldehyde produced by the respective resistant isolates of these strains may still be adequate to give proper flavour characteristics to the fermented dairy product.

Many colour, flavour, and structure defects are caused by antibiotics in cheese manufacture. Penicillin at a level of 0.005 IU per ml resulted in strong off flavour and uneven eye formation in Swiss cheese (Mayra-Makinen, 1993). Table 2 illustrates the effect of some antibiotics in the manufacture of Swiss cheese and Edam cheese. The inhibitory effect of antibiotic on acid production in yoghurt is shown in Table 3.

**ii) Effects of technological/manufacturing processes on residual antibiotics in milk :** The most common manufacturing processes to which milk is subjected before it reaches the consumer relate to (i) various heat treatments as found in pasteurisation, evaporation and drying, (ii) freezing and (iii) concentrating effects of separation, evaporation and drying.

As shown in Table 4, antibiotic residues in milk are not inactivated by normal pasteurisation procedures. It was also evident that penicillin and streptomycin are not destroyed by condensing and drying (Hansen *et al.*, 1950). Autoclaving milk at 1 bar for ten minutes did not destroy all the

aureomycin in it, when milk was obtained from cows treated with 200mg per quarter of aureomycin (Hammer and Babel, 1957). Sterilisation might inactivate some residues. While tetracycline is comparatively less heat resistant, neomycin and streptomycin will even survive sterilisation. Further, if antimicrobial activity is destroyed, the breakdown compounds formed during heating might produce an allergic response. This might be true particularly with penicillins, since many individuals give an allergic response to microbiologically inactive penicilloates as well as parent compounds (Moats, 1988).

The separation of milk into cream and skim milk does not result in a concentration of either penicillin or streptomycin in any of the two fractions. However, chlortetracycline is concentrated in the skim milk fraction. The antibiotic is most concentrated in the filtrate which remains after the casein and whey protein are removed from the skim milk. It follows from this that chlortetracycline remains dissolved in the serum phase of milk.

Depending on their solubility properties, the drugs in milk occur in the aqueous phase, in the milk fat or are bound to the proteins of milk. For instance, the sulphonamides are dissolved in the aqueous phase, whereas barbiturates occur in part, dissolved in the milk fat. The barbiturate barbitone, which has a low lipid solubility is found in the aqueous phase, and the pentobarbitone which is highly lipid soluble is bound primarily to milk fat (Schmidt, 1971).

Ultrafiltration of contaminated milk can eliminate much of soluble antibiotics. Kosikowski and Jimenez-Flores (1985) reported that when raw milk added with penicillin G (0.10-0.13 IU per ml) was ultrafiltered to 3.1 total protein concentration, the retentate diafiltered/washed three times, each time with water equal in volume to that of UF permeate, the penicillin content was reduced to approximately 0.007 IU per ml. After reconstituting to the original volume, penicillin was not detected in the milk. Retentates washed with fresh milk permeates rather than water were similar to high quantity market milk.

#### What are the control measures ?

Efforts have been made at national and international levels to detect, evaluate and suggest control measure for eliminating antibiotic and drug residues from food products. Method used for the detection and analysis of residues of antibiotics in milk include chromatographic, fluorometric, polarographic, photometric and

microbial methods (Hamann *et al.*, 1979; Kosikowski, 1982). Of these, the microbial assay methods are most common. However, for many antibiotics and sulphadriugs used in mastitis therapy, with the exception of penicillin G, a wide gap exists between concentrations regarded as toxicologically safe and levels that can be detected by microbial screening assays (Suhren, 1993). The Charm II test is many times more sensitive than any of the current methods of detecting antibiotic or sulphadriugs in milk (Reid, 1990).

Control is attained only by constant vigilance and testing milk at the farm and dairy plant systematically with reliable tests. Some milk that might have low levels of contamination is diluted with vast amounts of uncontaminated milk, so that there are no detectable residues in milk products. Unfortunately, there are not enough inexpensive farm tests that may be used to detect the extremely low levels of residues that the Charm II test and other sophisticated tests are capable of detecting. The conventionally used tests, such as the microbial screening assays are incapable of detecting low levels of residues. Hence, milk is mixed into processing channels and it may not be until the product is actually in the market, before contamination is detected. However, several approaches have been considered to overcome the problem associated with contaminated milk.

Various methods have been proposed for controlling the effect of antibiotic on lactic cultures. Although most of the studies have involved penicillin, some of them also apply to other antibiotics. Use of enzyme inhibitors, chemical inhibitors, reconstituted milk for culture preparation and addition of extra amounts of culture are the suggested solutions.

Penicillinase (or pennase) added to milk helps to reduce the penicillin content of milk, by opening the beta-lactam ring in the penicillin molecule with the formation of penicillinoic acid, resulting in the complete loss of its biological activity. Such a reaction takes place on the addition of various acids, alkalies, ammonia and amines (Hammer and Babel, 1957). For certain ripened cheeses, like Blue and Camembert, it has been observed that penicillinase is produced by bacteria on their surfaces and about half-way into the cheese. This destroys the effectiveness of penicillin as an antibiotic and presumably, the power of a penicillin-contaminated cheese to harm sensitive humans (Kosikowski, 1982).

The use of reconstituted milk can help



**Table 3 : Effect of different antibiotics on acid production during yoghurt preparation**

Antibiotic	Production*	
	pH	°SH**
Control	4.04	50.3
Penicillin 0.01 IU/ml 0.02 IU/ml	4.06	49.9 **
	4.20	45.2 **
Tetracycline 0.5mg/ml	5.48	17.5
Streptomycin	5.16	24.0
Sulphadimidine 30mg/ml	4.07	49.5 **

\* - Incubation 4 h, 42 ° C, 2% inoculation (Wiesby JOG2 culture)

\*\* - taste bitter; no aroma

++ - °SH = ml of N/4 NaOH per 100ml

Ref : Mayra-Makinen (1993).

**Table 4 : Inactivation of some antibiotics by heat treatment of milk**

Antibiotic	Concentration in milk	Heat Treatment		% Reduction
		Temp °C	Time (min)	
Streptomycin	1 mg/ml	70	30	Nil
		70	60	8.3
		70	90	8.3
Neomycin	1 mg/ml	70	30	Nil
		70	60	9.1
		70	90	10.0
	20-50 ug/ml	100	3-5 h	75-100
		120	20	15-50
Penicillin	0.13-0.96 IU/ml	62	30	8.2
		71	15	10.1
		121	15	59.7
		70	30	20.0
		70	60	30.0
	0.15-0.25 ug/ml	70	90	30.0
		100	30	20-40
		100	60	50-65
		100	90	85-100
		100	90	85-100
Oxytetracycline	0.125-2.0 ug/ml	100	30	75-100
		100	60	100
Chlortetracycline	0.3-0.51 ug/ml	62	30	16.6
	0.2-0.62 ug/ml	71	30	27.6
	0.4-0.5 ug/ml	121	15	100

Ref : Moats (1988).

avoid difficulties resulting from the unexpected presence of penicillin in the fresh milk intended for culture preparation. Increasing the amount of inoculum also reduces the activity of penicillin, but this is successful only in the milk containing not more than 0.1 IU per ml penicillin. There has been work to adapt cultures to penicillin too, by cultivating cultures in media containing penicillin (Hammer and Babel, 1957)

#### What do we conclude ?

The usefulness of antibiotics and drugs against mastitis and other diseases in animals have rendered them almost indispensable in veterinary medicine. However, their intelligent, rather than indiscriminate

use can help to prevent any health hazards or financial losses occurring due to their antimicrobial activity.

The following preventive measure could be of considerable benefit to consumers and the milk processors :

- Regular monitoring of the raw milk supplies by means of suitable test method and penalties for the delivery of contaminated milk.
- Antibiotic treatment of cows affected by mastitis should be carried out only under veterinary supervision. Clinical cases must be treated as soon as they occur. Cases of subclinical mastitis should be treated if possible at herd level at the beginning of the

dry period.

- Each preparation of antibiotic used for treatment of milch animals should be tested for determining the maximum interval before all traces are secreted. The appropriate withholding time, usually 72 hours, should be observed.

Once antibiotics and drugs find their way into milk, it is very difficult to get rid of them. Heat treatment is generally not effective in inactivating the contaminants. However, processes such as ultrafiltration (UF) can help considerably decrease the antibiotic load of milk. Thus, conversion of milk into cheese employing UF could be considered for handling of contaminated milk so as to minimise the losses. Use of specific enzymes such as penicillinase to inactivate penicillin may be helpful in salvaging all components of the contaminated milk, at perhaps, some extra cost.

#### References

- Abou-Donia, S.A. and Reda, M.M. (1992) Microbiological assay of antibiotics in Egyptian dairy products. *J. Dairy Sci.*, 75 (Supplement) 1: 137.
- Babu, K.S., Singh, R.S. and Chander, H. (1989) Effect of antibiotic resistance on the flavour profile of lactic acid bacteria. *J. Dairy Sci.*, 56: 155.
- Boosinger, J. (1990) Milk safety- who's responsible. *Dairy, Food and Environmental Sanitation*, 10(8) : 489-490.
- Hamann, J., Tolle, A. and Hessecheu, W. (1979) Antibiotic and sulphonamides. *Int. Dairy Fed. Bull.*, 113: 43.
- Hammer, B.W. and Babel, F.J. (1957) *Dairy Bacteriology*. John Wiley and Sons Inc., New York, pp: 402-403.
- Hansen, H.C., Wiggins, G.E. and Boyd, J.C. (1950) Modern methods of mastitis treatment cause trouble in the manufacture of fermented dairy products. *J. Milk Food Technol.*, 13: 359.
- Hill, B.M. and Smythe, B.W. (1991) Sulphonamides and the New Zealand dairy industry. *Dairy Sci. Abstr.*, 54: 2156.
- Irvine, D.M. and Hill, A.R. (1985) *Comprehensive Biotechnology*. Vol. 3. ed. Murray Moo-young., Pergamon Press, Oxford, New York, Toronto, Sydney, Frankfurt. p: 529.
- Kosikowski, F.V. (1982) *Cheese and Fermented Milk Foods* F.V. Kosikowski and Associates, New York., pp. 31, 639.
- Kosikowski, F.V. and Jimenez-Flores, R. (1985) Removal of antibiotics from contaminated milks. *Dairy Sci. Abstr.*, 47: 2576.

Contd. on Page No. 54



# Prevalence of Enteropathogens in Fresh Juices of Fruits and Vegetables

by

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A total of 55 juice samples comprising of seven oranges, twenty two Mosummi, nine pomegranates, five each of sugarcane and carrot, four apple and one each of sugarbeet, pineapple and mixed vegetable juices were analysed to determine microbial load and presence of enteropathogens of public health significance. Average TPC/ml varied from  $6.0 \times 10^4$  to  $4.13 \times 10^7$  and average coliform count was  $1.1 \times 10^3$  to  $1.1 \times 10^5$  per ml of juice samples. Eight *E. coli*, 31 *Klebsiella* spp. and 14 *Serratia* spp. strains were isolated from juice samples, however, no *Salmonella*, *Shigella*, *Edwardsiella* and *Aeromonas* could be isolated in this study. All the strains isolated in the study were resistant to ampicillin and colistin, however multiple drug resistance against tetracycline, streptomycin, gentamicin, ciproflaxocillin, cotrimoxazole and nitrofurantoin was also present in some strains of *K. pneumoniae* var *aerogenes*, *E. coli* and *Serratia marcescens*. In the study heat labile and heat stable enterotoxin activity was detected in cell free culture filtrate of *E. coli*, *K. pneumoniae* var *aerogenes* and *S. marcescens* broth cultures. There appears to be no relationship between presence of type of pathogenic microorganism and type of juice sample however, coliform count was significantly higher in vegetable juices like carrot and sugarbeets, in comparison to fruit juices. This study revealed the hazard of consumption of raw contaminated fresh vegetables and fruit juices.

## Introduction

Fruit and vegetable juices are common beverage of all people and are often offered to the sick and convalescents for fast recovery. Many studies all over the world have been conducted to assess the microbiological quality of juices (Dar *et al.* 1992). *E. coli*, *Klebsiella* spp. and *Staphylococci* are reported as major pathogens of human health significance in sugarcane juice and vegetable juice samples (Kulshrestha, *et al.* 1977-82). Fruit juices have also been reported to be vehicle of *E. coli* and *Klebsiella* spp. in diarrhoeal outbreaks. So this study was initiated to assess the microbial quality of available market juices with special reference to enteropathogens

like *E. coli*, *Klebsiella*, *Salmonella*, *Edwardsiella* and *Aeromonas*.

## Materials and Method

A total of 55 juice samples were collected from juice vendors near human hospitals in Bareilly city. Samples comprised of carrot juice (5), pineapple juice (1), mixed vegetable juice (1), pomegranate juice (9), sugarbeet juice (1), orange juice (7), apple juice (4), sugarcane juice (5) and mosummi juice (22). Samples were collected (30ml) aseptically in sterile glass tubes and brought to laboratory on the ice within an hour. The total aerobic plate count and coliform count was done on plate count agar and MacConkey agar respectively according to standard procedure (Cruickshank *et al.* 1975; ICMSF, 1978). For isolation of specific microorganisms specially *E. coli*, *Klebsiella*, *Salmonella* and *Aeromonas* procedure of ICMSF 1978 and Cruickshank *et al.* 1975 were followed. For isolation of *Edwardsiella*, enrichment was done in *Edwardsiella* broth (Farmer and McWhorter 1984) and plating on *Edwardsiella* agar (Singh, 1994). All the isolates were characterized on the basis of cultural, morphological and biochemical characteristics (Edwards and Ewing, 1972).

All the characterised isolates were tested for pathogenicity in *in vivo* experimental studies viz. mouse lethality (Cruickshank *et al.* 1968) and enterotoxigenicity (Evans *et al.* 1973, Singh and Kulshrestha, 1992).

The antibiotic sensitivity of pathogens isolate was tested with disc diffusion method of WHO (1961) by using 30 mcg discs of tetracycline, 10 mcg discs of ciproflaxocillin, streptomycin, ampicillin, colistin, gentamicin, 300 mcg discs of nitrofurantoin and 25 mcg discs of Cotrimoxazole.

## Results and Discussion

Results of aerobic plate counts and coliform counts are presented in Table-1. It is evident from the table that total aerobic plate count as well as coliform count is appreciably low in apple and pineapple juice samples in comparison to juices of other fruits and vegetables. This may be due to better quality of the fruits used. Coliform count was exceptionally high in juices of carrot and sugarbeet which may be attributed to their origin from soil, which are usually manured with excreta of human beings and animals. Survival of coliforms in soil is well documented and reports of vegetable-borne diseases are there (Jay, 1987; Gieslak *et al.* 1993). The total plate count (TPC) varied between  $6.6 \times 10^3$  to  $5.5 \times 10^7$  per ml and coliform count nil to  $4.5 \times 10^5$  per ml depending on type of juice, additives used and also from shop to shop. The water used for cleansing machine, and equipment used for juice extraction and washing of drinking vessels may be a contributory factor. Another contributory factor appears to be ice used for diluting and cooling of juices. The average

Table -1. Microbial load in various juices of fruits and vegetables

Type of fruit/ vegetable juice	No. of samples	Total aerobic plate/ml		Coliform count/ml	
		mean	range	mean	range
Orange juice WA	4	$1.05 \times 10^6$	$3.3 \times 10^5$ - $2 \times 10^6$	$8.62 \times 10^3$	$2 \times 10^2$ - $2.5 \times 10^4$
Orange juice A	3	$1.17 \times 10^7$	$2.1 \times 10^5$ - $3.2 \times 10^7$	$6.0 \times 10^4$	$1.1 \times 10^2$ - $1.8 \times 10^5$
Mosummi juice WA	4	$4.13 \times 10^7$	$8 \times 10^5$ - $1 \times 10^7$	$7.15 \times 10^3$	$1 \times 10^2$ - $2.4 \times 10^4$
Mosummi juice A	18	$1.67 \times 10^7$	$2 \times 10^4$ - $5.5 \times 10^7$	$2.93 \times 10^4$	$2 \times 10^2$ - $2 \times 10^5$
Pomegranate juice WA	9	$4.22 \times 10^6$	$1.2 \times 10^4$ - $2.5 \times 10^7$	$3.45 \times 10^4$	$0$ - $1.7 \times 10^5$
Sugarcane juice A	5	$2.24 \times 10^6$	$1.2 \times 10^6$ - $2.4 \times 10^6$	$5.12 \times 10^3$	$1.8 \times 10^3$ - $1.2 \times 10^4$
Carrot juice A	5	$5.44 \times 10^6$	$6.4 \times 10^5$ - $1.2 \times 10^7$	$1.11 \times 10^5$	$1.2 \times 10^3$ - $4.5 \times 10^5$
Apple juice WA	4	$4.82 \times 10^5$	$6.6 \times 10^5$ - $9.1 \times 10^5$	$1.95 \times 10^3$	$1 \times 10^3$ - $4.10^3$
Sugarbeet juice A	1	$2.6 \times 10^6$	-	$3.5 \times 10^4$	-
Pineapple juice A	1	$3 \times 10^5$	-	$3 \times 10^3$	-
Mixed vegetable juice A	1	$6 \times 10^4$	-	$1.1 \times 10^3$	-

A = with additives

WA = without additives. Additives are generally added to improve taste and flavour of juices.



per ml TPC and coliform of washing waters was  $3.6 \times 10^5$  and  $1.8 \times 10^4$ , and of ice was  $3.2 \times 10^5$  and  $1.2 \times 10^2$  respectively. The quality of water and ice used was very poor and required proper attention.

**Table 2. : Prevalence of various enteropathogens in juices of fruits and vegetables**

Type of Juice	No. of Samples	Faecal E. coli	Klebsiella	Serratia spp.
Orange juice WA	4	0	0	0
Orange juice A	3	0	1	2
Mosummi juice WA	4	0	0	1
Mosummi juice A	18	1	10	6
Pomegranate juice WA	9	0	6	4
Sugarcane juice A	5	3	4	0
Carrot juice A	5	3	4	1
Apple juice WA	4	0	4	0
Sugarbeet juice A	1	1	1	0
Pineapple juice A	1	0	1	0
Mixed vegetable juice A	1	0	0	0
	55	8 (14.5%)	31 (56.36%)	14 (25.45%)

No *Salmonella*, *Shigella*, *Edwardsiella* and *Aeromonas* could be isolated from abovementioned juice samples.

**Table- 3. : Antibiotic sensitivity pattern of enterotoxigenic pathogens isolated from juices**

Type of pathogens	Source of isolation (No. of isolates)	Type of toxin excreted	Antibiotics sensitive
<b>K. aerogenes</b>	Apple (3)	LT	T, CF
	Sugarbeet (1)	LT	T, CF
	Carrot (2)	ST	T, CF, GM, CO
	Sugarcane (2)	ST, LT (1)	T, CF
		LT (1)	T, CF, CO
	Pomegranate (1)	LT	
<b>E. coli</b>	Mosummi (3)	ST	T, CF, CO
			T, CF
	Sugarcane (1)	LT, ST	CF
	Orange (1)	LT	NE, CO, S
<b>Serratia</b>	Mosummi (1)	LT	GM
	Carrot (1)	LT	NE, CO, S, GM

ST- Heat stable enterotoxin, LT- Heat labile enterotoxin, T- Tetracycline, CF- Ciproflaxacillin, S-Streptomycin, CO- Contromoxazole, NE-Nitrofurantoin, GM-Gentamycin.

Results of isolation of specific enteropathogens are presented in Table-2. The isolation of enteropathogens of public health significance is essentially an important observation because juices are taken as such without further processing. Isolation of faecal *E. coli*, *K. pneumoniae*

var *aerogenes* *K. oxytoca*, *K. planticola*, *Serratia marsescens* and *S. liquifaciens* from 14.5, 49.09, 5.45, 1.81, 10.90 and 14.54 percent samples of juices was recorded. However, *Salmonella*, *Shigella*, *Aeromonas* and *Edwardsiella* organisms could not be isolated from juice samples. The isolation of *E. coli* and *Klebsiella* spp. from sugarcane juice and fruit juice samples is well documented (Kulshrestha *et al.* 1977-82).

Multiple drug resistance in enterotoxigenic strains of *Klebsiella pneumoniae* var *aerogenes* (Table-3) was found chiefly against streptomycin, cotrimoxazole, nitrofurantoin, ampicillin, gentamicin and colistin. All *Klebsiella* strains were sensitive to tetracycline and ciproflaxacillin and few to cotrimoxazole and gentamicin, the only enterotoxigenic *E. coli* from sugarcane juice was resistant to all except ciproflaxacillin. On the other hand all three enterotoxigenic *Serratia* isolates were sensitive to all antibiotics except tetracycline, ampicillin and colistin.

On further characterization it was observed that out of 3 *Serratia*, 1 *E. coli* and 12 *Klebsiella aerogenes* enterotoxigenic isolates, most killed the mice (on i/p injection of 0.1 ml, 18 hr growth in brain heart infusion broth) within 36 hrs of injection during pathogenicity trials (Cruickshank *et al.* 1975) except 5 enterotoxigenic *Klebsiella* isolates. It was also observed that all the mouse lethal isolates of *Klebsiella aerogenes* and *Serratia* were not enterotoxigenic, when tested in rabbit ileal loop, rabbit vasopermeability factor test, mouse paw oedema test and infant mouse tests, but their antibiogram was quite similar to other enterotoxigenic isolates. Out of 12 enterotoxigenic *Klebsiella* isolates 5 produced heat stable (ST), 6 heat labile (LT) and only one ST and LT enterotoxins both. All enterotoxigenic *Serratia* produced only LT and one *E. coli* isolate produced both type of enterotoxins. The enterotoxin producing capability in enteropathogens isolated from juice samples is of importance because enterotoxigenic *E. coli* and *Klebsiella pneumoniae* var *aerogenes* have been reported to cause a large orange juice-borne diarrhoeal outbreak (Singh *et al.* 1993).

Enterotoxigenic enteropathogens were not related to any specific type of fruit juice. These were isolated from all types. The similar type of antibiogram in majority of the *Klebsiella* isolates indicates their common source of origin and water used for cleansing and washing may be one of these, however, no enterotoxigenic *Kleb-*

*siella* has been isolated from water samples tested in this study or otherwise (Holme & Gross, 1990).

Isolation of enterotoxigenic *Serratia marsescens* is important from the public health point of view because there are very few reports of enterotoxin production by *Serratia* and it needs further investigation (Jiwa *et al.* 1981). Identification of pathogenic potential in micro-organisms isolated from juice samples is significant because of the association of these enteropathogens with outbreaks (Jay, 1987; Cruickshank *et al.* 1975).

#### Acknowledgement

Authors are thankful to Director, IVRI and Head Division of Veterinary Public Health, IVRI, Izatnagar for providing financial and laboratory facilities. Authors also want to acknowledge the technical assistance of Mr. K.K. Arya and Mr. R.S. Bora and Mr. G.S. Bisht for typing this manuscript.

#### References

1. Cieslak, P.R.; Barret, T.J.; Griffin, P.M.; Gensheimor, K.F.; Beckett, G.; Buffington, J.; Smith, M.G. (1993). *Escherichia coli* O157:H7 infection from manured garden. *Lancet* 342: 367.
2. Cruickshank R.; Duguid, J.P.; Swain, R.H.A. (1968). *Medical Microbiology*, 11th ed. ELBS and E&S Livingstone Ltd. Edinburgh.
3. Cruickshank R.; Duguid, J.P.; Marmion, B.P.; Swain, R.H.A. (1975). *Medical Microbiology* 12th ed. Churchill Livingstone Ltd. Edinburgh.
4. Dar Gh, H.; Zargar, M.Y.; Shah, G.H. (1992). Effect of processing operations and heat treatment on physico-chemical characteristics and microbiological load of apple juice concentrate. *Ind. Food Packer* 46:45-50.
5. Edwards, P.R. and Ewing, W.H. (1972). *Identification of enterobacteriaceae* 3rd ed. Burges Publishing Co. Minneapolis, Minnesota.
6. Evans D.G.; Evans Jr. D.J.; Gorback, S.L. (1973). Identification of enterotoxigenic *E. coli* serum antitoxin activity by vasopermeability factor assay. *Infection and Immunity* 8: 731-735.
7. Farmer III J.J. and Mc Whorter, A.C. (1984). *Edwardsiella*, in *Bergey's Manual of Systematic Bacteriology* Vol. 1 ed. Krieg N.R.; Williams and Wilkins, Baltimore USA pp 461-491.
8. Holmes, B. and Gross, R.J. (1990). Coliform bacteria in Topley and Wilson's *Principles of Bacteriology, Virology and Immunity*, 8th ed. Vol. II eds. Parker M.T., Duerden B.I. Edward Arnold, London, pp 415-442.
9. ICMSF (1978). *Microorganisms in Foods*. International Commission on Microbiological Specifications for foods. University of Toronto Press, Toronto.
10. Jay, J.M. (1987). *Modern Food Microbiology*, 3rd ed. CBS Publishers and Distribution, New Delhi.

Contd. on Page No. 54



# Preparation of Some Food Products from Wood Apple

by

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## Introduction

In India, area under fruit cultivation is over 294 Mha having total fruit production of 26.5 Mt. Banana, guava, mango, grape, orange and apples are the important fruit crops. These fruit are tender and delicate during the early stage of plant growth and very sensitive to climatic conditions, temperature in particular. However, there are a few fruit trees which do well in hot climate of tropical and subtropical region. These include wood apple, bael, custard apple, ber, tamarind, etc. They possess high contents of nutritional and medicinal values even though they remained low valued fruits. Maharashtra State government has favoured the cultivation of tropical fruit trees through various programmes through the Department of Agriculture, Department of Horticulture and the Department of Social Forestry. The area under cultivation of these fruits has increased over four-folds in recent years. Among these, one of the important fruit crops is wood apple. It contains about 57% rind, 23% seed and fibrous matter and 20% pulp (Kulkari and Dhurdeo, 1994). It also contains good amount of protein, vitamin and minerals (Table 1). The technologies are necessary to be applied on wood apple to improve its storability and acceptability. Among the various processing principles and technologies, dehydration and product development are the easy, effective and economic ways to preserve the fruit contents. Therefore, the study was undertaken with an objective to develop various stable food products from wood apple.

## Material and Methods

### 1. Material

The matured fruits of wood apple were

Table 1 : Composition of wood apple

Constituent g/100 g edible portion		Constituent g/100 g edible portion	
Moisture	68.5	Carbohydrate	15.5
Protein	7.3	Calcium	0.1
Fat	0.6	Phosphorus	0.1
Minerals	1.9	Vitamin B	0.2
Fibres	5.2	Iron	0.6
		Energy	97 cal.

obtained from the local market. The fruits were washed with water and cleaned thoroughly. The fruit were cut into two pieces and pulp was extracted by using hand press method.

## 2. Methods

### 2.1 Preparation of powder

The pulp was extracted from ripe wood apple. Seeds and fibrous material was separated from the pulp. The pulp was then placed in solar cabinet dryer for dehydration. The temperature in the solar dryer was maintained between 50° to 60°C. The dried sample was placed overnight in desiccator for cooling and equilibration of moisture. Dehydrated pulp was crushed into powder in a household mixer. The pulp was analysed for percentage weight loss, colour and acidity.

### 2.2 Preparation of jelly

The pulp of fruits was extracted in juicer (Electro-cum-Solid State Control) and was allowed to stand for 2 hours. The scum formed at the surface of the extract was removed by stainless steel spoon. The extract was boiled for 1/2 hour. After boiling, it was cooled and then passed through four layers of muslin cloth and filtered through ordinary filter paper. The sugar added in the ratio of 1:1 with the pulp. The citric acid 2.5 g and potassium metabisulphate preservative 0.2 g per litre were mixed in the extract mixture. The mixture was then boiled up to 105°C by controlling the foam formation in the extract/jelly. Hot jelly was filled in sterilized bottles. Jelly setting took place on cooling. Bottles were sealed, labelled and stored (Fig. 1).

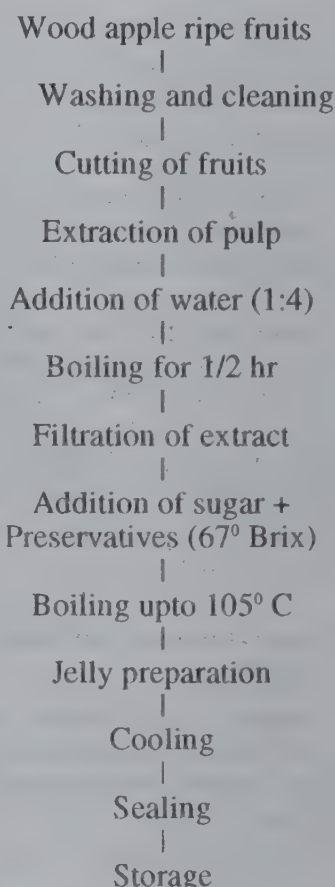


Fig. 1. Flow Chart of Jelly from Wood Apple

### 2.3 Preparation of syrup

The pulp separated from wood apple was boiled in water (1:4 ratio) for 1/2 hour. It was strained and filtrate was mixed with sugar up to 58° Brix. Potassium metabisulphate (0.2 g/litre) was added as preservative. The mixture was then boiled for 1/2 hour to get syrup (67° Brix). It was bottled after cooling. The syrup was analysed for taste, colour, flavour, overall acceptability and consumer index.

Table 2 : Properties of wood apple product

Properties	Jelly	Syrup	Bar	
			Khoa	Milk Powder
Colour	Tyrian purple to ruby red	Indian Yellow	Squirrel brown	Peach beige
Acidity %	0.46	1.56	1.55	0.64
Protein content %	0.67	0.50	0.48	0.48



Table 3. Consumer index of wood apple products

Product	Taste	Colour	Flavour	Overall acceptability	Consumer Index
Jelly	7.4	9.8	8.8	8.8	0.875
Syrup	9.4	8.4	8.4	8.8	0.875
Bar (khoa)	8.4	8.0	7.8	8.2	0.810
Bar (milk powder)	9.2	8.8	8.6	9.0	0.885

## 2.4 Preparation of bar

The pulp free from seeds and fibrous matter was taken. The sugar was added with a ratio of pulp to sugar as 2.5:1. The mixture was heated for 1/2 hour. At this stage, khoa or milk powder was added in the ratio of 4:1. It was further heated to mix the ingredients thoroughly. Then poured into the plate having the moulds. After moulding and cooling, khoa bar and milk powder bar were sealed and packed in plastic polyethylene wrappers. They were stored in cool place.

## 2.5 Chemical analysis and sensory evaluation

The chemical analysis was done for colour using Royal Horticultural colour, RHC charts, acidity and protein content by AOAC methods (1970). The sensory evaluation was done by a panel of eight judges

using ten point hedonic scale according to the method given by Amerine et al. (1965).

## 3. Result and Discussion

### 3.1 Wood apple powder

Wood apple pulp was dried in solar dryer at about 50°C for 6.5 hours. Dehydrated pulp was brittle and was easily crushed to powder. The colour of powder was found almond shell from grey orange group with C.I.A. Coordinates as 0.460, 0.397, 22.0. The acidity of powder was obtained 9.46%. One thousand grams of pulp yielded about 311 grams of powder.

### 3.2 Wood apple jelly, syrup and bar

The properties of wood apple jelly, syrup and bar (khoa and milk powder) are given in Table 2. The acidity of syrup and khoa bar was more as compared to jelly and milk

powder bar. The protein content of these products was found between 0.48 to 0.67%. The sensory evaluation of wood apple products is tabulated in Table 3. It indicated that all these products of wood apple were highly acceptable considering the mean score, the rating of taste of the product was in the order of Syrup > Milk powder bar > Khoa bar > Jelly. The rating of colour and flavour was in the order of jelly > Milk powder bar > Syrup > Khoa bar. It means that the taste of syrup was found superior, whereas colour and flavour of jelly was found superior over the other products. The consumer index was maximum for product like milk powder bar (0.885) followed by syrup and jelly. The consumer index was minimum for khoa bar (0.810). The results of the study concluded that the products like milk powder bar, syrup, jelly and khoa bar could be prepared. These products are nutritious and are very much accepted by the consumers.

## References

- Amerine, M.A., Pangborn, R.M. and Roessler, E.B. (1965). Principles of Sensory Evaluation of Food, Academic Press, New York and London.
- AOAC (1970). Official methods of analysis. 11th ed. Washington D.C.
- Kulkarni, S.G. and Dhurdeo, A.V. (1994). Processing of wood apple and mango for various food products. B.Tech. thesis. Punjabrao Krishi Vidhapeeth, Akola

Contd. from Page No. 50

## Antibiotic and Drug Residues ...

Krzyzanowski, J., Lopuszynski, W., Krakowski, L. and Szczubial, M. (1993) Drinking milk in the light of laboratory investigations. Dairy Sci. Abstr., 55: 7297.

Larsen, B.L. (1985) Biosynthesis and cellular secretion of milk. Lactation. ed. Larsen, B.L., Iowa State University Press, Ames, Iowa., p. 159.

Larsen B.L. and Smith, V.R. (1974) Lactation, Vol.III., Academic Press, New York and London. p. 147.

Marth, E.H. and Ellickson, J. (1959) Antibiotic residues in milk and milk products - A review. J. Milk Food Technol., 22: 241.

Mayra-Makinen, A. (1993) The Valio T101 method (T101 test). Int. Dairy Fed. Bull., 283: 29-31.

Moats, W.A. (1988) Inactivation of antibiotics by heating in foods and other substrates - A review. J. Food Protection, 5:491.

Reid, D.A. (1990) The antibiotic residue problem - A veterinarian's viewpoint. Dairy, Food and Environmental Sanitation, 10: 489-490.

Rybinska, K. and Karkocha, I. (1992) Determination of antibiotic residues in selected foods of animal origin. (1993) Food Sci. Technol. Abstr., 25: 11085.

Salam-Abdullah, A., Rahman-Omar, A. and Rajion, M.A. (1991) Antibiotic residues in cow's milk. Dairy Sci. Abstr., 55: 8210.

Schallibaum, M. (1991) Antibiotic contamination of milk : analysis of possible causes. Dairy Sci. Abstr., 55: 2294.

Schmidt, G.H. (1971) Biology of Lactation., W.H. Freeman and Co., San Francisco., p. 306.

Suhren, G. (1993) Experience with an IDF-experimental study for the detection of penicillin and tetracycline applying routinely used methods. Int. Dairy Fed. Bull., 283: 15-19.

Wiesener, H.U. (1991) Avoidance of inhibitor substance in delivered milk. Dairy Sci. Abstr., 55: 6404.

Contd. from Page No. 52

## Prevalence of Enteropathogens....

11. Jiwa, S.F.H.; Krovacek, K. and Wadstrom, T. (1981). Applied Environmental Microbiology. 41: 1010-1019.
12. Singh, B.R. (1994). Edwardsiella and Klebsiella, in annual scientific report of Division of Veterinary Public Health, IVRI, Izatnagar. 1993-1994.
13. Singh, B.R. and Kulshrestha, S.B. (1992). Preliminary examination on the enterotoxigenicity of isolates of *Klebsiella pneumoniae* from seafoods. International J.Foods Microbiol. 16:349-352.
14. Singh, B.R.; Kulshrestha, S.B.; Kapoor, K.N. (1993). An orange juiceborne diarrhoeal outbreak due to enterotoxigenic *Escherichia coli*, in Proceedings of International Foods Convention 7-12 Sept. Mysore BIM 6 pp 36.
15. W.H.O. (1961). Standardization of Methods for conducting Microbic sensitivity tests. Technical Report Series 210, World Health Organization, Geneva.

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# Antimicrobial Food Preservatives - Indian Scenario

by

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Since antiquity, man has sought means to preserve freshly harvested foods for later use. Traditionally, foods have been preserved by the use of heat (canned foods), cold (refrigerated and frozen foods), drying (dehydrated foods) and fermentation (curd, wine). Besides these, chemicals have been used either to retard the microbiological spoilage or to arrest the development of off-flavours and discolourations taking place during processing and storage of food materials. According to U.S. Food and Drug Administration chemical preservatives have been defined as "those chemicals that when added to foods tend to prevent or retard deterioration, but does not include common salt, sugar, vinegar and spices (or oils extracted from spices) or substances contributed by woodsmoke". According to this definition preservatives include antioxidants which are used to prevent autoxidation of fats/ oils, pigments and flavours; antibrowning compounds which are used to prevent enzymic and non-enzymic browning; antistaling compounds which are used to prevent textural changes in foods such as use of emulsifiers in bread; and antimicrobial additives which are primarily used to prevent or arrest the growth of microorganisms in foods. However, in general usage, the term food preservative is mainly employed to describe substances that are employed to arrest or prevent microbiological spoilage in food products during handling, processing or storage. Prevention of Food Adulteration Act (PFA) which prescribes the use of various additives in foods in India defines preservatives as "substances which when added to food, are capable of inhibiting, retarding or arresting the process of fermentation, acidification or decomposition of food". According to this Act preservatives have been classified into Class I and Class II preservatives. Class I preservatives include common salt, sugar, dextrose, glucose syrup, spices, vinegar or acetic acid, honey and edible oils. All these substances are normal constituents of foods and there is no restriction on the levels of their usage in foods. Class II preservatives, on the other hand, are those substances which are listed and where maximum permissible concentration to be used in food products has been defined. These substances include sulphur dioxide, sodium

and potassium salts and sulphite and metabisulphite, benzoic acid and its sodium and potassium salts, propionic acid and its sodium, potassium and calcium salts, methyl and propyl esters of p-hydroxy benzoic acid, sodium or potassium diacetate, nisin and sodium and potassium nitrate and commercial saltpetre. The food materials in which the use of various preservatives is allowed under PFA is given in Table 1.

In India use of more than one preservation in foods, until and unless specified as per Rule 55, is not allowed. For example, in cheese and processed cheese use of both sorbic acid and nisin is permitted provided their total concentration does not exceed above 1000 ppm. In

other foods where use of sulphur dioxide or benzoic acid is allowed individually, these may also be used combinedly provided their concentrations is reduced proportionately. For example, in jams and marmalade the use of sulphur dioxide and benzoic acid is allowed at 40 and 200 ppm respectively. If both these preservatives are used in combination and if sulphur dioxide is present at 20 ppm, then the use of benzoic acid has to be restricted to 100 ppm only.

## Factors influencing the selection of preservative

a) **Properties of food and preservative** : The suitability of an antimicrobial additive in food products is determined by

Table 1. Preservative permitted under PFA

Preservative	Max. permitted concentration (ppm)
1. Sulphur dioxide, sulphite and metabisulphites	Meat sausages (450), fruit, fruit pulp or juice for conversion into jam or crystallized glazed fruits, cherries (2000), other fruits (1000), fruit juice concentrate (1500), dried fruits: apricots, peaches, apples and other fruits (2000), raisins and sultanas (750), non-alcoholic wines, squashes, crushes, fruit syrups, cordials, sharbats, fruit juices and barley water to be used after dilution (350), jams, marmalades, preserves, canned cherry and fruit jelly (40), crystallised glaze or cured fruit (150), fruit and fruit pulp not specified (350), plantation white sugar, cube sugar, dextrose, gur or jaggery and misri (70), khandasari (sulphured) and bura (100), corn starch and such lime starches (100), corn syrup (450), canned Rassagolla (100), gelatine (1000), beer (70), cider (200), sweetened mineral water and sweetened ready to serve beverages (70), pickles and chutneys made from fruits and vegetables (100), dehydrated vegetables (2000), hard boiled confectionery (350), dry mixes of Rasagollas (100), fruits and vegetable flaked powder, fig (600), soups (other than canned) (150), dried soups (1500), dehydrated soup mix when packed in containers other than cans (1500).
2. Benzoic acid and its Sodium and potassium salts	Jams, marmalade, preserves sodium and potassium salts canned cherry and fruit jelly (200), non-alcoholic wines, squashes, rushes, fruit syrups, sharbats, cordials, fruit juices and barley water to be used after dilution (600), alcoholic wines (450), sweetened mineral water and sweetened ready to serve beverages and brewed ginger beer (120), coffee extract (450), pickles (250), tomato and other sauces, tomato puree and paste (750)
3. Methyl or propyl esters P-hydroxy benzoic acid	Flour for baked food (500)
4. Propionic acid and its sodium potassium and calcium salts	Flour for baked foods (3200), bread (5000), paneer and chhana (2000)
5. Sorbic acid and its sodium, potassium and calcium salts	Cheese or processed cheese, cheese spread (1000), paneer or chhana (2000), bread (1000), preserved chapaties (1500), wrappers for smoked fish.
6. Sodium diacetate	Bread (4000), flour for baked food (2500)
7. Nisin	Cheese, cheese spread, processed cheese (1000)
8. Sodium or potassium nitrites	Cooked pickled meat including ham and bacon (200)
9. Commercial saltpetre	Cooked, pickled meat including ham and bacon (500)



the nature of the food products, its pH and composition, nature of spoilage normally encountered during handling and storage, the level of microbial contamination, physical and chemical properties of the antimicrobial compound, its sensory properties and safety and method of application. Loss of antimicrobial activity can occur if the preservative reacts with food constituents resulting in binding of the chemical structure of the preservative. The pH of the food can result in ionisation of an active group in the preservative molecule and thereby change its activity. Some preservatives can be oxidised or hydrolysed which may also alter their sensory and microbial activity. Antimicrobial activity of sulphites and bisulphites is known to decrease considerably by their reaction with aldehydes and reducing sugars. Protein and fibre can bind several preservatives and diminish their antimicrobial activity. Some of the preservatives which are hydrophobic in nature tend to partition in lipid phase of food and thereby get concentrated away from water phase where microbial growth occurs.

**b) Level and type of microorganisms:** Processing treatment employed for the food prior to incorporation of preservative can directly influence the microbial flora and total microbial load and thus the choice of preservative. A preservative can never be a substitute for sanitation in a food processing operation and low microbial loads should always be sought. If the number of microorganisms contaminating a food product is high, significantly higher concentration of preservation may be needed. Also, since the antimicrobial spectra is often different for each preservative, the nature of microbial flora contaminating the food product significantly influences the choice of preservative to be employed.

**c) Influence of other preservation treatments:** Antimicrobial preservatives are rarely used alone. Their use is combined with other processing treatments like pasteurisation, partial dehydration, refrigeration and packaging. The type of preservation method used in conjunction with antimicrobial preservative will also have a significant influence on the type and level of antimicrobial preservatives needed. A lowering of water activity will encourage the growth of osmophilic yeasts and molds, thus requiring the antimicrobial preservative capable of limiting the growth of these organisms. Refrigeration, on the other hand, is generally selected for psychotropic gram-negative microorganisms. Packaging also

**Table 2. Acceptable Daily Intake (ADI) of Preservatives Recommended by WHO**

Preservative	Acceptable Daily Intake (mg/kg body wt per day)
Acetic acid including potassium and sodium salts	no limit
Benzoic acid and its potassium and sodium salts	0 - 5
Formic acid	0 - 3
Hexamethylene tetramine	0 - 0.15
p-hydroxy benzoic acid esters	0 - 10
Lactic acid and its salts	no limit
Natamycin (pimaricin)	0 - 0.3
Propionic acid and its salts	no limit
Sodium diacetate	0 - 15
Sodium and potassium nitrate	0 - 5
Sodium and potassium nitrite	0 - 0.2
Sorbic acid including its calcium and potassium and sodium salts	0 - 25
Sulphur dioxide, sodium sulphite and sodium bisulphite, sodium and potassium metabisulphite	0 - 0.7

alters the environment of the food and thus influences the growth pattern and type of microorganisms. Vacuum and inert gas packaging normally employed for protection against rancidity development invariably discourages growth of molds and several aerobic bacteria, but encourages the growth of certain anaerobic organisms.

**d) Safety:** Physiological harmlessness of the preservatives is one of the most important consideration for their use in foods. However good a preservative may be in its antimicrobial activity and sensory quality, its use in foods cannot be permitted until and unless its safety is proved by animal feeding studies. Based on long term feeding studies, World Health Organisation has laid down acceptable daily intake (ADI) for various additives (Table 2). It gives the quantity of a preservative, measured in milligrams which can be ingested daily without any harmful effects throughout life span. It is expressed in milligrams per kg body weight. The use of a particular additive in a food is allowed if the total daily intake through dietary consumption is less than the acceptable daily intake. In actual practice, the total daily consumption of many additives is hardly 10-20% of the ADI.

**e) Economics of preservative usage:** If an antimicrobial preservative satisfies all the criteria discussed above, it may still not be widely used by the industry until it is inexpensive enough and has the ability to pay for itself based on the reducing spoilage and minimising food

borne illness. For example, even though sorbic acid is far superior to benzoic acid in antimicrobial action as well as sensory quality, its use is not as prevalent as that of benzoic acid mainly because of its higher cost.

#### **Suitability and use of individual preservatives.**

**a) Sulphur dioxide, sulphites and bisulphites:** In aqueous solution sulphur dioxide exists as sulphurous acid, sulphite and bisulphite ions. Its microbial growth inhibiting effects are most intense when it is in the unionised form as sulphurous acid. Also, sulphur dioxide is more inhibiting to bacteria than yeasts and molds. Major use of sulphur dioxide and its salts as antimicrobial agents is in beverages and fruits preservation. Its use in dehydrated fruits and vegetables, soups and other mixes is mainly to control non-enzymic browning. In beverages and fruits, the use of sulphur dioxide and its salts is mainly made use in the control of acetic acid producing and malolactic bacteria, fermentation and spoilage yeasts and fruit molds. Among the acetic acid producing bacteria *Acetobacter* peroxydans are most important. It has been observed that 100-200 mg/litre of sulphur dioxide are necessary for inhibiting *Acetobacter* cells in grape juice. Also, common bacteria in acidic fruits and beverages are lactic acid producing genera, *Lactobacillus*, *Leuconostoc* and *Pediococcus*. In wines, levels about 120 mg/litre of sulphur dioxide decreased the incidence of malolactic fermentation.

In wine industry sulphur dioxide is



widely used to deplete 'wild' yeasts in grape juice. Among the various yeast species, *Torulopsis* and *Saccharomyces* are most tolerant and these are becoming a problem in juices, soft drink and wine industry.

Mold infection during transit and storage is one of the most serious problems in the marketing of fresh grapes and other fruits. *Botrytis* sp. is probably the most prevalent fungi, but others also infect the fruit including *Cladosporium*, *Alternaria*, *Stemphyllium*, *Penicillium*, *Aspergillus*, *Rhizopus* and *Uncinula*. Slow release sulphur dioxide generators "Grape guards" which can be placed into storage containers seem to be quite beneficial for the transport of grapes and are used commercially.

Sulphur dioxide is widely used as a temporary preservative in fruit pulps and juices in raw or semi-finished products and removed again in the course of processing during the action of heat or vacuum so that the residual quantities in the end product are on the whole small. Besides, antimicrobiological function in almost all products where sulphur dioxide is used, it has other technological functions to perform, such as protection against oxidative, enzymic and non-enzymic browning reactions and inhibition of chemically induced colour and vitamin losses. The applied concentrations of sulphur dioxide necessary for these purposes are higher than the concentrations needed for micro-biological control. Depending upon the products in general between 0.01 and 0.2%, sulphur dioxide is employed and even higher concentrations may be used in selected cases. Sulphur dioxide reacts with vitamin B<sub>1</sub> and makes it unavailable. Therefore its use should not be recommended to foods which serve as major sources of this vitamin in the diet. Also, sulphur dioxide decolourises foods which derive their colour from anthocyanins.

Recently, sulphur dioxide, sulphites and metabisulphites have been found to precipitate allergic reactions in about 10% of the asthmatic persons and their use in cut fruits has been banned in USA.

**b) Benzoic acid and its salts:** In most countries benzoic acid and its sodium and potassium salts are permitted for food preservation. The maximum permissible quantities vary from 0.15 to 0.25%. In USA, benzoic acid and sodium benzoate are considered GRAS (generally recognised as safe) upto a maximum concentration of 0.1%. In UK, benzoic acid and sodium benzoate are permitted

on a wide scale. In India, benzoic acid and its salts are permitted upon a maximum level of 0.075% in selected food products. Use of benzoic acid is mainly directed against control of yeasts and molds. Most yeasts and fungi are inhibited by 0.05 to 0.1% of the undissociated acid. Bacteria are only partially inhibited and therefore benzoic acid cannot be relied upon to effectively preserve foods capable of supporting bacterial growth. Benzoic acid has been found to act synergistically with both sorbic acid and sulphur dioxide and combinations of benzoic acid and sorbic acid have been reported to inhibit many bacterial strains better than either benzoic acid or sorbic acid alone. Effectiveness of benzoic acid increases with lowering of pH and it is most effective below pH 4.5.

Benzoic acid is widely used in the preservation of fruit products and pickled vegetables. It is used in these products on a wider scale than sorbic acid because of its lower price. Fruit pulps can be preserved by additions of 0.1 to 0.13% sodium benzoate against molds and fermentations. Sodium benzoate is widely used to preserve fruit juices and ready to serve fruit beverages. Combined with pasteurisation to inactive enzymes and with small quantity of sulphur dioxide to protect against oxidation, sodium benzoate in 0.05 to 0.2% concentration is applied depending upon the type of juice and the length of time to which preservation is needed.

Sodium benzoate either alone or in combination with sorbate is also used in the preservation of margarine, peanut butter, mayonnaise and fish marinades.

**c) Sorbic acid and its salts:** Preservative action of sorbic acid is mainly directed against yeasts and molds including aflatoxin producing fungi. Bacteria are only partially inhibited; catalase positive are more sensitive than catalase negative. Microbial inhibitory action of sorbic acid is also pH dependent and decreases with rise in pH. However, even at higher pH, sorbic acid is more effective than propionates and benzoates and therefore it is widely used for bakery and confectionery products like cakes, fillings for chocolates and various types of cheese and cheese spreads. Action of sorbic acid against mycotoxin forming organisms is especially important in this direction. Sorbic acid has also been successfully employed in the development of shelf stable ready to eat chapatias in our country.

In cheese industry, sorbic acid is applied in many ways. It may be directly

added to fresh or processed cheese as sorbic acid or as potassium sorbate. Sorbate is also incorporated in the brine solution or as acid for dusting of cheese surface. Fungistatic wrappers containing calcium sorbate are also very effective for the prevention of fungal growth of cheese and bread. In India sorbic acid treated wrappers are permitted for the packaging of smoked fish products.

Sorbates have been found useful for prevention of surface mold growth on hard sausages. Recently the use of potassium sorbate has been recommended along with small quantities of nitrite for the preparation of cured ham and bacon. Use of sorbate helps in the reduction of nitrite use because of their involvement in the formation of nitrosamines which are reported to be carcinogenic. Inclusion of potassium sorbate in the curing mixture prevents the growth of *Clostridium* and the formation of Botulinum toxin.

Sorbates are also used in the preservation of fermented vegetable products and vegetables pickled in vinegar. Gherkins and olives in vinegar are protected by 0.1 to 0.2% potassium sorbate against film-forming yeasts and mold attack. Also, presence of sorbate inhibits lactic acid fermentation only slightly but suppresses the growth of film-forming yeasts and molds.

Sorbates have also been recommended for the preservation of prunes and fruit pulps. For this purpose, sorbates are combined with small quantities of sulphur dioxide to prevent enzymic browning and oxidation. Sorbates at 0.02% have been suggested for the control of surface molds in jams and jellies and protected against spoilage by yeast in soft drinks. Use of sorbic acid has been found to be highly beneficial to sterilize wines against refermentation. A combination of 200-250 mg potassium sorbate and 20-40 mg free sulphur dioxide provides wines with comprehensive protection.

Sorbic acid and sorbates are permitted in almost all the countries in 0.1 to 0.2% concentration. In USA, sorbic acid and sorbates are considered GRAS. In UK and EEC countries, use of sorbic acid and potassium sorbate is allowed in a number of food products in concentrations upto 0.2%. Sorbates are one of the most widely investigated preservatives about their safety and based on these data WHO has prescribed highest ADI of 25 mg/kg body weight for sorbates.

**d) Propionic acid and propionates:** Sodium and calcium salts of propionic



acid are widely employed for the prevention of mold attack in sliced bread and to some extent for preservation of cheese. Propionates with relatively higher concentrations have to be used for preservation of foods. Owing to its low dissociation constant, propionic acid can be used for preserving foods with high pH. Secondly, propionates are effective against molds and *Bacillus mesentericus*, the bacteria that causes rope in bread. Owing to their weak inhibitory action against yeast, propionates do not unduly inhibit yeast leavening in bakery goods. In USA, 5 to 10% solution of sodium and calcium propionates are employed for the surface treatment of hard cheese against mold attack. The use of propionates is allowed in paneer and chhanna in India, but it is not allowed in processed cheese. In USA, calcium and sodium propionates are considered GRAS. In UK, propionic acid, calcium and sodium propionates are permitted in bread and other bakery products upto a maximum concentration of 3000 ppm, on the basis of wheat flour.

**e) Esters of p-hydroxy benzoic acid:** The esters of p-hydroxy benzoic acid were produced mainly to replace benzoic acid and salicylic acid which were mainly effective in highly acidic products. Methyl-, propyl-, butyl- and heptyl-esters of p-hydroxy benzoic acid though having better antimicrobial activity than benzoic acid, have not found wide acceptance in food preservation mainly because of their very low water solubility and organoleptic properties. The antimicrobial action of p-hydroxy benzoic esters is proportional to the chain length of the alcohol component and increases with the chain length. Like benzoic and sorbic acids, p-hydroxy benzoic esters are primarily fungistatic in action. However, because of phenolic group, p-hydroxy benzoic acid esters are more effective than benzoates against bacteria especially gram-positive strains. Minimum inhibitory concentrations against various bacteria and fungi at pH range of 5 to 7 vary from 12 to 400 ppm.

Though p-hydroxy benzoic acid esters namely, methyl, ethyl, propyl and butyl esters are permitted by almost all countries as food additives, because of their pronounced taste and smell, these are not utilised on a wide scale by food industry. Currently, these are chiefly utilized in the preservation of pharmaceuticals and cosmetic preparations because of their efficacy in preventing microbial activity even in weakly acidic or neutral pH range. In India, the use of methyl and propyl derivatives is permitted in flour for baked goods to a maximum level of 500 ppm.

In USA, methyl, ethyl and propyl esters are considered GRAS and their use is permitted upto 0.1% (1000 ppm). In UK also, methyl, ethyl and propyl esters are permitted in a number of foods as preservatives. Major use of p-hydroxy benzoic acid esters is in the preservation of sausages and meat coatings containing gelatin and also in the fish marinades where it is combined with sorbic and benzoic acids. Alcoholic solutions of esters are sometimes used for preserving cheese. These are also used for preventing microbial growth in confectionery fillings. Recently, n-heptyl-p-hydroxy benzoate has been found to be very useful in beer preservation and its use has been permitted in USA.

**f) Nisin:** Nisin is a polypeptide type antibiotic produced by *Streptococcus lactis*. It is mostly active against gram-positive bacteria, many lactic acid bacteria, streptococci, bacilli, clostridia and other anaerobic spore forming microorganisms responsible for spoilage in canned foods and dairy products especially processed cheese. Yeasts and molds are not inhibited by nisin; infact many of them tend to decompose it rapidly. Proteolytic enzymes like trypsin, pancreatin, digestive enzymes and salivary enzymes, but not rennet, hydrolyse and inactivate nisin. The action of nisin is directed against the cytoplasm membrane and consequently nisin is more active against spores than vegetative cells. Addition of nisin in canned foods is reported to reduce thermal processing time for sterilization.

Major use of nisin all over the world is in the preservation of processed cheese, where primary action of nisin is directed against spore forming microbes mainly *Clostridia* and butyric acid species. Nisin is also used on a small scale as an auxillary sterilizing agent in canned vegetables. However, usefulness of added nisin in this respect is disputed.

**g) Sodium diacetate:** Sodium diacetate is effective in preventing mold growth in malt syrups at 0.5% level. At 0.1 - 0.2% level it prevents mold growth in cheese spreads. Sodium diacetate is very effective in baking industry because of its inhibitory power against bread mold and rope while at the same time having little effect on baker's yeast. In bread and cakes, it is employed at 0.25-0.4% level. In India sodium diacetate is allowed in bread.

**h) Nitrites and nitrates:** Nitrates had been used for centuries for food preservation mainly for curing and pickling of meat. Nitrates themselves do not have antibacterial action, but during curing these get converted into nitrites which are inhibitory to toxin forming bacteria, clostridia and *Staphylococcus aureus*. The preservative action of nitrites is mainly due to the formation of nitrous acid and other oxides of nitrogen and their action increases with decreasing pH value. In meat industry nitrites and nitrates are mainly used as colour fixatives. Nitrites react with myoglobin forming nitrosomyoglobin which has bright red colour and is not affected by atmospheric oxidation. Bright red colour of cured and/or pickled meat and sausages is due to nitrosomyoglobin. Nitrites also delay off-flavour development during storage of processed meat products. Besides use of nitrates in dry curing, these are also added to vat milk (0.01-0.02%) to avoid blowing in hard cheese. During curing process nitrates get reduced to nitrites which have been implicated in antibacterial action.

Recently, addition of nitrites in meat has been implicated in the formation of nitrosamines which have been reported to be carcinogenic in nature and efforts are underway to find suitable replacements for this preservative.

From the foregoing discussion, it is evident that antimicrobial preservatives have an important role in food processing, storage and distribution. Use of preservatives help in prevention of food spoilage and in marketing of many products. If used in scientific and judicious manner, antimicrobial preservatives help in prevention of food spoilage and minimises chances of food borne illness. In developing countries like India where refrigeration storage and transportation are not well developed, use of preservatives will greatly help in prevention of post-harvest losses and in making available to the consumers a variety of food products in safe state. Though excess use of chemical preservatives is harmful, the levels permitted in India are lower than those required for safe preservation of perishable products and being practiced in many advanced countries. It is also desirable that use of certain preservatives such as sorbic acid and benzoic acid which have been found to be quite safe is allowed in more food products to prevent spoilage during transportation and storage. On the other hand, sulphites have been found to precipitate allergic reaction in certain sensitive people, their use shall be declared on the label.



# Potato Flour from Waste Potatoes

by

V.R. Sagar, S.B. Maini & Sahni, Charanjit Kaur

Division of Fruits & Horticultural Technology, Indian Agricultural Research Institute, New Delhi - 110012

Production of Potato has made significant progress in recent years. At present India is the fourth largest potato growing country in the world producing 15.1 million tonnes annually on 0.96 million ha. with an average yield of 15.1 t/ha. Though most of the produce is used for human consumption in India, but per capita availability is only 18 kg/year. It is much lower than USA (67 kg) Poland (908 kg) and the UK (110 kg).

It is an important horticultural crops used by both rich and poor. It is rich in good quality proteins and carbohydrates and is available in India round the year and found as a good supplement to the cereals diet. Potato products are more well balanced in protein and more calories/ area/ time than any other plant food.

In India actual availability of potatoes is much lower because 10% of total produce is used as seed and 10-15% is wasted during harvesting and post harvest operations due to non-availability of sufficient cold storage facilities. There was a cold- storage capacity of 6.2 million tonnes in 1989, the production was 14.89 million tonnes. Therefore a large quantity of the extra production is stored, exposed to hot summer followed by a hot and humid rainy season. Such storage conditions lead to losses due to shrinkage and rotting. Processing of potatoes prevents colossal losses, and adds value to the produce. In USA and UK processed potatoes account for 34 and 63 per cent of the total production.

Three main sources of potato waste are damaged produce from harvest, sprouted, green and damaged potato from storage and rejected once, Fresh potato can be converted into chips after blanching and powdered to make potato flour for further use in other products. If the quality of chips is not good, they can be used as animal feed.

## Preparation of Chips :

After removing the sprouted parts, the potatoes are thoroughly washed and peeled with the help of knife in a small scale unit and with the help of alrasine peeler in a large scale plant. The peeled potatoes are kept in water to prevent browning. Then potatoes are cut into slices of 5mm thickness in a shredding machine, blanched in boiling water for 5 minutes and then cooled by immersing the blanched material in cold water. The slices are then treated with 0.1 % Potassium Metabisulphite for 30 minutes. After draining the slices are dried to a minimum level of 2-3 per cent moisture content.

## Preparation of flour :

Slices can be ground into flour in a powder mill or stone mill (common chakki). The powder is sieved through 30 mesh sieve to get a fine flour.

## Packaging :

Studies on the packaging and storage requirement of potato produce showed that the equilibrium relative humidity at a moisture level of 4.18 of potato flour was 60 per cent. The critical and damage point of the flour was found to be at 8.04 and 10.08 per cent moisture level respectively. Polyethylene film of 400g LDP (Low density) was found to be better as a packing material as compared to lower gauge and material could be kept satisfactory upto 6 months at room temperature and upto 9 months at low temperature (7°C).

## Preparation of products :

The Potato Tikki is prepared by mixing hot water with potato flour. Keep aside, chop green chillies, onion and dhaniya, mix chillies, onion, dhaniya, zeera, amchur, salt and potato flour. Make small balls, flatten and

fry in little ghee or oil. Serve hot with chutney or tomato sauce.

## Burfee :

It is prepared after mixing hot water and potato flour. Cook khoya and potato flour on slow fire. When it turns light brown add sugar and elaichi. Keep stirring on slow fire. When done put a little ghee on a plate and spread the above mixture. Let it set, then cut into square shapes.

For its preparation, fry khoya, when it turns pink, add raisins, grated coconut, potato flour and sugar, fry for 5 or 10 min. Mix maida and ghee well. Add milk, make small balls and rolls into small chappaties. Put about one full table spoon of the mixture in each chapati, fold over and seal edge by cutting. When all are done, heat ghee or oil and fry.

## Potato Halwa :

For the preparation of potato halwa, heat ghee. Cook flour for 7 minutes on slow fire. Add sugar and mix well with potato flour. Add water and keep stirring all the time. When water dries up add ground elaichi and dry fruits.

## Potato Gulab Jamun :

Gulab Jamun are prepared after mixing hot water and potato flour. Make small round balls and fry on a slow fire until light brown. Put sugar in two cups of water, boil and make a syrup. Add gulab jal and gulab jamun to syrup. Let it cook for 15 minutes.

## As animal feed :

The sun dried potato chips contain 15-16 per cent moisture, 2.5 -3.5 per crude protein and 3492 kcal/kg dry matter. The chips can also be used as animal feed.

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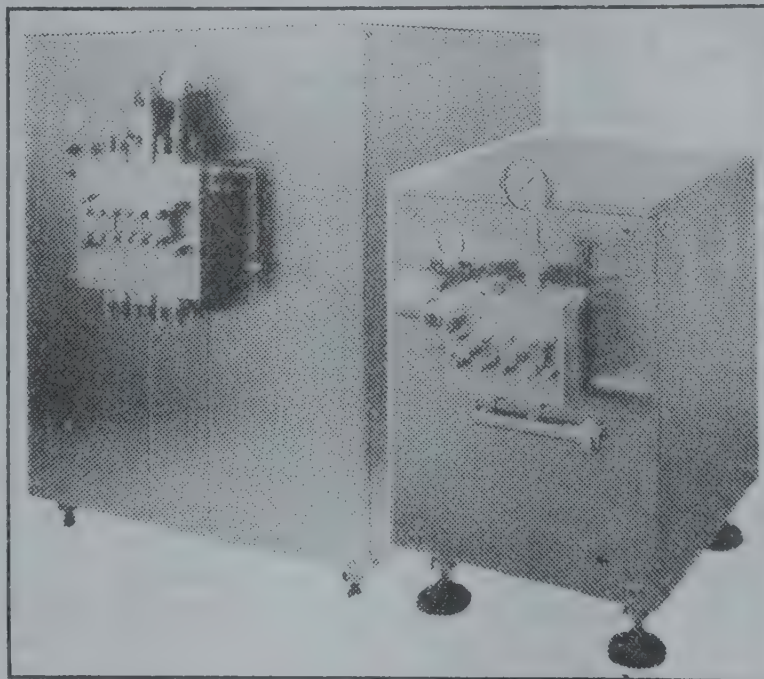
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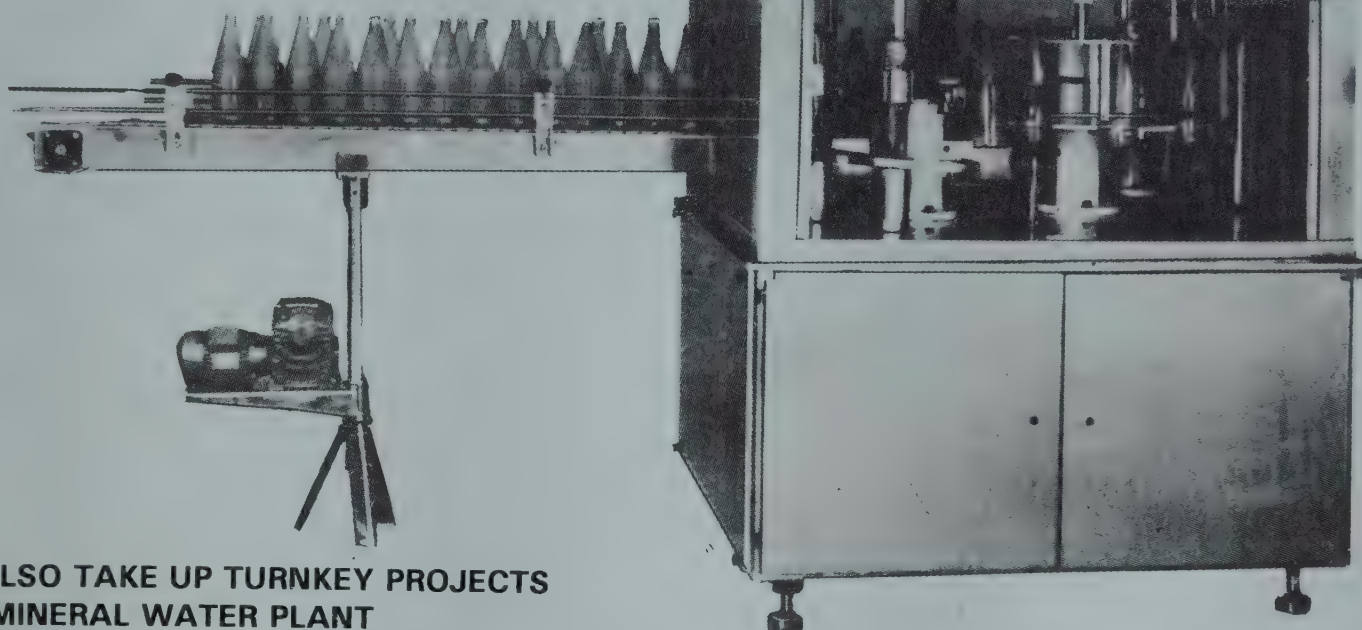
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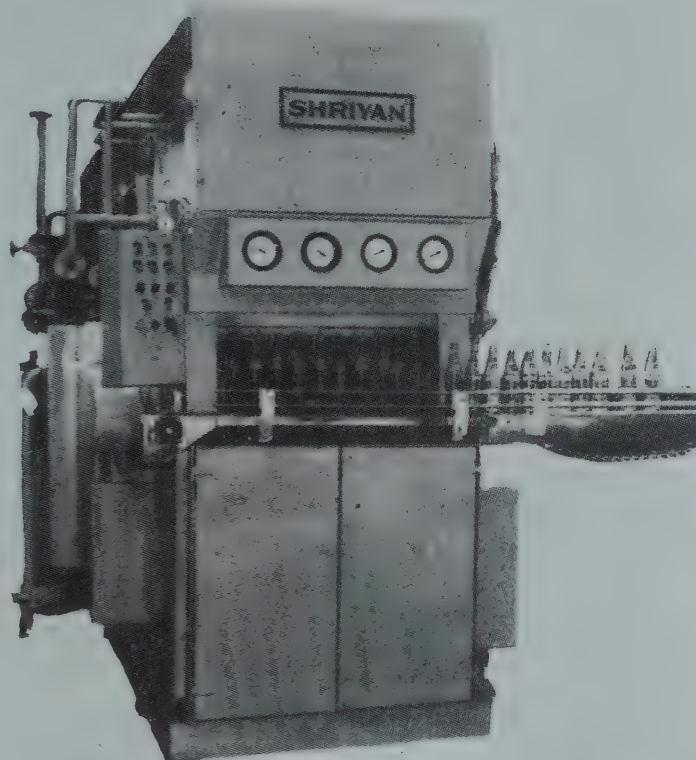
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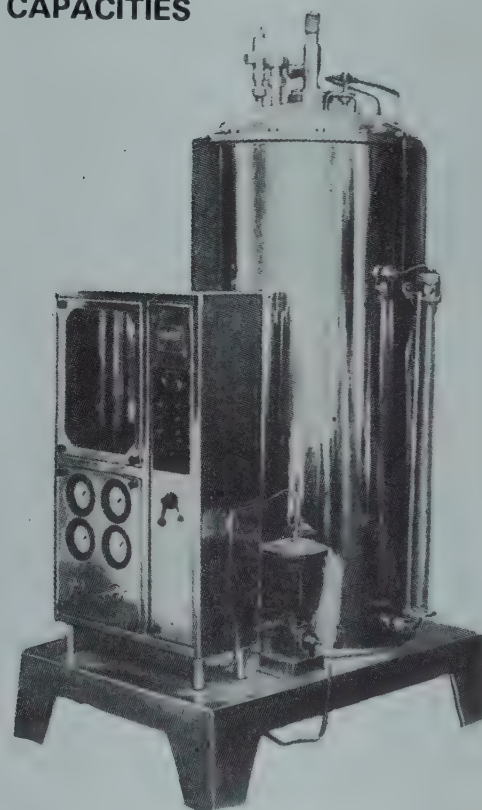


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# NEWS & NOTES

## EXCISE TARIFFS FOR AERATED WATERS

The Central Board of Excise and Customs (CBEC), has issued a notification fixing excise tariffs for aerated water falling under heading no. 22.02 of the schedule to Central Excise Tariff Act, 1995.

It is applicable to aerated waters containing added sugar or other sweetening matter or flavour in the.

❖ Bottles containing more than 200 millilitres but not exceeding 300 milliliters at Rs 2.70 per bottle,

❖ Bottle containing more than 300 millilitres but not exceeding 500 milliliters at Rs 3.75 per bottle,

❖ Bottle containing more than 500 millilitres but not exceeding 1000 milliliters at Rs 7.50 per bottle.

## DAIRY SECTOR FACING IMPORT THREAT

The Dairy industry has been told to strive for making quality milk available at affordable prices to avoid being hit adversely by cheaper imports.

Addressing the 27th Dairy Industry conference at Anand recently, K Rajan, Secretary, Department of Animal Husbandry and Dairying of the Union Government,

lamented that the present level of per capita consumption of 192 grams of the milk per day was much lower than in many countries.

"As we seek to improve the incomes to increase the purchasing power of all segment of our society, it would also be equally necessary that the cost of production of milk or its products are such that the bulk of the population would consider these as affordable", he said.

"Otherwise, in the present economic policy framework of seeking to integrate the Indian economy with the global economy, one may find the cheaper imports may emerge as a major challenge with adverse impact on the dairy producers in the country," he said.

Conversely, if the prices of milk and milk products can ensure steady growth of the internal markets and permit access to all sections of the society, Rajan said our prices are likely to be competitive in the international markets and boost exports in the wake of the opportunities thrown up by the World Trade Agreement.

The Indian Dairy Association (IDA) President, Animesh Banerjee, in his introductory address expressed concern over the emergence of the neutralised and synthetic milk and regretted that the dairy industry

had remained a silent spectator to the developments.

If the industry was to think global, Banerjee said, than it must ceaselessly strive to attach the greatest importance to the highest quality milk and asked every segment of it to remain vigilant and work actively and aggressively to check the penetration of lower grade milk varieties into the markets

Banerjee said the industry should strive not only for the supply of quality milk but for quality producers, quality managers and 'in other words, quality dairymen.'

## WHEN CHOCOLATE IS NOT CHOCOLATE ?

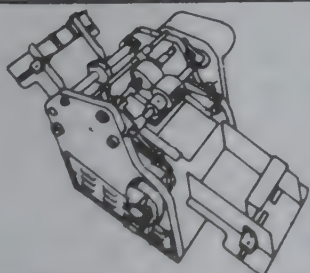
Europe's march towards open borders keeps encountering nationalism in the strangest circumstance - not always a sweet tale in itself. Eurocrats now find themselves at loggerheads over what many in other parts of the world may call a trifling matter the true nature of chocolate. While nations such as Britain, Denmark, Norway and Austria traditionally add a small amount of vegetable fat to their chocolate, Belgium, France and Germany require that chocolate makers use only cocoa, cocoa butter, milk and sugar.

The purists, joined by tropical cocoa-

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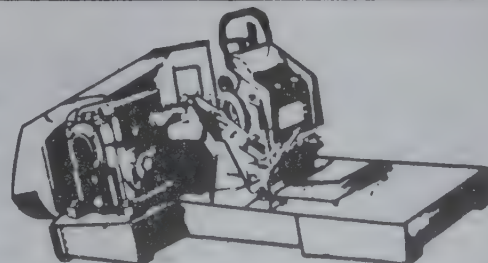
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producing nations eager to ensure a market for exports, have asked the European Commission to forbid any candy made with vegetable fat from being labelled as chocolate. Which, in turn, has landed the entire issue into a sour pickle. Obviously, one man's meat is another man's poison. "I don't like the term vegetable fats," said Richard Frost, spokesperson for British confectionary giant Cadbury in a recent news report. "It sound as if the chocolate bar is made from brussels sprouts."

It seems the treat of a continental chocolate standard is taken particularly seriously in the United Kingdom where citizens actually spend nearly \$ 1.93 billion a year on chocolates alone. For all its soft spot for the stuff, Britain doesn't quite have the biggest sweet tooth in Europe, however. A recent chocolate industry supported study showed that the Swiss, at 10 kg per head, consume the most annually, followed by Norway at 7.9 kg, and the Benelux countries at 7.8 kg and the UK at 7.4 kg.

Nevertheless, "chocolate is immensely popular in Britain," according to the Cadbury spokesperson. The taste and quality of chocolate is something people identify with - it evokes memories of childhood.

Apparently with whisky, people will tell you they have a preference, but they really can't tell the difference in a blind taste. With chocolate they know. Users of vegetable fat are contending that any tampering with true time-honoured recipes could prove a disaster.

The Commission is discussing a compromise that would allow the optional use of five per cent non-cocoa vegetable fat and raise the minimum level of cocoa solids, but member nations have refused to budge. Earlier this year, the Germany tabloid Bild Zeiting ran an anguished front page story headlined, "EU will make our chocolate worse." Not only that, the Ivory Coast's ambassador to Belgium has publicly called for Europe to harmonise its legislation, citing the irrevocable "damage that will be done to the image of chocolate." On the other hand, Britain's parliamentary secretary to the food industry has vowed to fight hard: to make sure that traditional British chocolate bar is not destroyed by European Union legislation.

Whatever, the politics of the issue, the notion that chocolate high in cocoa solids is the best chocolate is wrong-headed. It's almost like saying that the best curry is the one that has the most curry powder. But at heart, the problem shows the inappropriateness of trying to legalise foodstuffs. Common goals are one thing, but a uniform palate is something else altogether.

## QUALITY CURBS ON BRANDED DAIRY ITEMS EXPORT TO GO

The director general of foreign trade has decided to withdraw the quantitative ceilings on exports of branded dairy products in consumer packs. Nestle and Amul will be the main beneficiary of the decision. Senior officials in commerce ministry said a notification for the waiver is expected to be issued by DGFT soon. Companies have been lobbying for removal of the ceilings for a while. It is likely that the liberalisation will be restricted to individual packs not exceeding 5 kg in weight. Industry sources said the benefit of the move would be limited because most Indian companies do not export under their own brand and often supply to well known brand-name owners abroad.

## AUSTRALIAN LIQUOR COS EYEING INDIA

Australian liquor and wines giants. Forsters and Lion Nathan, are actively probing the Indian market for joint ventures.

Ralph J L Evans, Managing Director Australian Trade Commission (Austrade), who is in India to open three new offices in Calcutta, Madras and Bangalore told a select news conference that as many as 85 companies were already operating in the Indian market. Austrade expectations are that another 30 companies would set up shop in India in the near future.

Evans said India's economy liberalisation and industrial modernisation have created major new markets for a number of Australian industries. "Australia is a world leader in areas such as infrastructure, mining technology, agribusiness, telecommunications, automotive components and energy, especially clean coal technology and environmental management", Evans claimed.

Australian investment in India presently stands at A \$ 400 million. By 2001 Austrade has projected an investment of around A \$ two billion. The two-way trade stood at A \$ 1.5 billion in 1994-95. It is projected to grow to A \$ three billion within five years, according to Austrade projections.

"The projections are based on level of enquiries interest of Australian businessmen in India and the pattern of growth of Australian trade seen in China and South East Asia" Evans said.

Evans closely interacted with the Confederation of Indian Industry and the Federation of Indian Chambers of Commerce and Industry (FICCI). In Calcutta, discussion took place with the RPG Group.

Uniworth, IFB and TCIL.

Evans visit is part of the New Horizons initiative launched by the Australian Prime Minister in February 1995. The idea is to provide India a picture of contemporary Australia as a technologically advanced internationally competitive and multicultural society.

"New Horizons will create an ideal platform for more Australian and Indian companies to explore new business opportunities with each other," Evans said.

## SPURIOUS BRANDS HIT TEA EXPORTS

The Tea Board of India has launched a promotional and awareness campaign in Dubai to popularise the beverage and raise awareness against spurious brands which have affected Indian tea exports.

Himangshu Sekhar Das, Director of the Tea Board, said India sold the best premium tea but many spurious brands were marketed worldwide in the name of "pure Indian" and "Darjeeling tea", taking advantage of the high price Indian tea command.

He said an estimated 45 million kg of Darjeeling tea were sold worldwide in 1994 though the actual production in Darjeeling was only nine million kgs which indicated the extent of the problem.

To counter it, the tea board is creating awareness on its three distinctive logos signifying Darjeeling, Assam and Nilgiri teas among the users in the region, he told reporters.

He said India has 17 per cent share of the tea market of 235 million kgs in the Middle East in 1994. Nine million kgs of Indian tea valued at Rs 774 million were sold in the UAE in the same year, and exports to UAE were marginally higher last year in price and quantity.

He said, for Indian tea the largest markets in the region was Egypt ( 12 million kgs in 1994) and Saudi Arabia. The spurious brands, however, were being sold worldwide, he said.

Das said the Tea Board was taking legal measures to check spurious brands by registering Indian logos in Egypt, Saudi Arabia, UAE and other countries.

But this was a time consuming process and hence the board has launched a campaign to create awareness about Indian logos which ensured Indian origin.

India's tea production in 1995 was estimated at 720 million kgs with the domestic



market accounting for almost 620 million kgs leaving little for export.

The demand kept price of Indian tea high at the auctions and hence it could not compete in terms of price with tea from Sri Lanka and other countries.

Das said the Board had launched tea demonstrations in Dubai and Abu Dhabi and Sharjah for four days beginning yesterday to popularise some 20 brands. Indian tea will be served free at six outlets of the Choithram and Sons supermarket chain during the campaign, he said.

Rajat Sen, also Director, Tea Board said CTC (crush-tear-curl) tea from India will be promoted for exports as it could yield double the quantity of tea compared to leaf tea.

### LIQUOR LICENCES CANCELLED

The excise department of the Delhi government has cancelled the licences of seven firms supplying liquor of the capital after inquiries revealed that they had manipulated records and fudged document to obtain licences.

The seven firms, whose licences have been cancelled, are GM Breweries, Ajanta Chemicals, Dewan Breweries, Karam Chand Thapar and Brothers, Horizon Alcohol Distillery, Ranson Industries and Associated Alcohol Distilleries.

### COCONUT SKIM MILK POWDER DEVELOPED

Perhaps for the first time in India, a new technology has been developed for the spray drying of coconut to produce coconut skim milk powder.

According to research scholar, V Ganesan, the coconut skim milk powder is prepared from spray drying of coconut skim milk, removing of testa, grinding, centrifugal protection, concentration and spray drying.

The product is a white, deliquescent powder with a fresh coconut flavour. It is a valuable commodity in the food and beverage industry and would be a low fat coconut flavoured beverage base.

### BIOTECH TO DEBITTER 'KINNOW' FRUIT JUICE

Biotechnology department of Punjabi university, Patiala, has successfully developed the technology at the laboratory level for debittering kinnow fruit juice by using immobilised enzymes as well as bacterial culture.

Kinnow mandarin is very popular

among the fruit growers of Punjab, Himachal Pradesh and adjoining areas because of its vigorous growth, high yield and increasing demand due to its delicious taste.

Processing kinnow juice is difficult because of bitterness caused by two components -naringin and limonin. The bitterness increases progressively, making it unacceptable to consumers.

The Biotechnology department of the Punjab University is all set to carry out the debittering of kinnow fruit juice at pilot scale, Professor SS Marwaha said.

The university, in collaboration with one of the leading fruit processing companies in the state, is currently preparing a scheme for the process of debittering for submission to the Department of Biotechnology, he added.

The department has also successfully tested biobleaching of pulp and paper mill effluents, which are dark brown in colour, using an immobilised white rot fungus in packed bed reactor system.

The immobilised cell system reduced colour and chemical oxygen demand to 92 per cent and 67 per cent respectively. It is proposed to test the technology at pilot scale in collaboration with one of the pulp and paper mills in Punjab.

### BEER IN INDIA FOUND WITH HIGH LEVEL OF NDMA

A study conducted by the Hyderabad-based National Institution of Nutrition (NIN) revealed that out of a sample of 120

brands, 101 brands of beers available in the Indian market contain an average of 3.6 parts per billion (ppb) of carcinogen N-Nitroso dimethyl amine (NDMA). This is higher than that found in many Western countries. The average NDMA level of beer is 0.14 ppb in Germany, 0.3 in Sweden, 1.6 in Japan and 1.2 in the Netherlands.

The survey also revealed that samples obtained from the southern states contain higher levels of NDMA compared to those from the northern states.

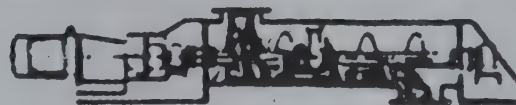
The industry is advised to change its malting technologies to reduce the NDMA levels.

### COCA-COLA IN NEW PACKAGES

Coca-Cola India, announced the introduction of Coca-Cola in 330 ml. Cans. Priced at Rs. 15/- each, they will simultaneously be available to consumers in New Delhi, Mumbai, Calcutta and Madras by January 28, 1996.

The cans will roll out from the company's state-of-the art canning line set up in Pune. This brand new line can fill upto 1100 cans per minute making Coca-Cola the first to introduce such technology into India.

The Cans have been packaged in 3 ply sturdy cartons to protect them from damage and carry special "image enhanced graphics" to ensure high visibility of the product at retail outlets. The packaging also carries instructions for use, both for the retailers and consumers to ensure a refreshing experience. This kind of packaging is the first of its kind in the world of Coca-Cola.



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# COMPANY NEWS

## HATSUN MILK FOODS

Hatsun Milk Foods Ltd. engaged in manufacturing and marketing of icecreams under the brand name "Arun" is tapping the capital market to part finance its expansion plans.

The company will set up exclusive ice cream parlours in Maharashtra. Hatsun also plans to set up manufacturing plants in neighbouring countries such as Sri Lanka and Dubai. For its plans in Dubai, Hatsun is holding talks with a local company for a marketing tie-up. This is expected to materialise in the next six months.

R.G.Chandramogan, Managing Director of Hatsun Milk Foods says that to increase its marketing network, the company will set up more parlours in Karnataka, Andhra Pradesh and Kerala. Presently, there are 437 such parlours in the South. In Tamil Nadu alone, the company has 280 parlours. This is the largest chain in the country.

Hatsun possesses two units, one in Salem with an installed capacity of 24 lakh litres and another near Madras with a capacity of 30 lakh litres from where it sources its milk requirements.

Apart from ice creams, Hatsun is also into jams, squashe sand cakes which are sold under its own brand name. As for its future plans, the company will add one new icecream plant every year. He said-

with all these plans taking off, the company will corner a market share of nine percent amounting to an approximate turnover of Rs. 22 crore in 1996-97.

## MEAT PRODUCTS

Meat Products of India, the largest company engaged in the meat processing in Kerala, has taken up a modernisation and expansion programme with the support of the State and Central Governments.

The company will set up a new meat processing plant at Thiruvananthapuram with an outlay of Rs.2.18 crore. Government has approved the proposal in principle. The State Government has accorded sanction to transfer 65 acres of land at Chettachal in Thiruvananthapuram district.

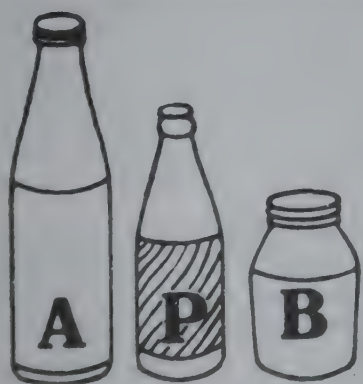
The project will handle 50 large animals and 50 small animals to process four MT of meat products in a single shift. The outlay for the project is Rs.220 lakh out of which 50 percent is under Central subsidy. Mr. M.N. Ramachandran, Managing Director of the company said that the company was implementing a modern poultry dressing plant to handle one metric million tonne of chicken in a day. The birds required for this plant is expected to be produced in a farm owned by the company. The total project outlay is Rs.55 lakh and has 50 percent Central subsidy.

The factory complex, set up in 1965, and many of the equipment needs urgent replacement. The company has taken up repairs necessary for the plant and machinery and erected a power generating plant with a 100 KVA diesel generator and 400 KVA transformer with control rooms and renovation of the entire electrical system. The first phase of the programme has been completed at a cost of Rs. 50 lakh and the second phase with the sanction amount of Rs.38.10 lakh has been taken up.

Meat Products India is expanding the capacity of the existing farm with additional facilities to produce 12,000 rabbits every year and supply to 1,200 small and marginal farmers with buy-back agreement. About 500 rabbits are processed everyday in the factory. The outlay for the scheme is Rs. 23.50 lakh. The company also proposes to increase production of exotic breed piglets to 40,000. These will be supplied to 1,500 families with buy-back arrangement. The project will cost Rs.14 lakh by way of 100 percent grant-in-aid by the Central Government.

The company also plans to increase the production of live-stock feed to 5,000 MT annually as against 2,000 MT now.

During 1995-96, the company anticipates a turnover of around Rs.300 lakh. The capacity utilisation during the year 1994-95 was 94.48 percent and further improvement at 99 percent is expected



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during the current year.

## DYNAMIX MILK

While private dairies in Gujarat continue to face difficulties with cooperatives opposing their entry, a Bombay-based company is setting up one of the largest integrated plants in the private sector in Baramati. Billed as the only plant in Asia capable of producing cheese, lactose, casein, milk powder, ghee, and butter in a single facility, the Dynamix Milk & Food Industries plant will use cow milk to produce a range of products for the export markets.

The Rs.116 crore project is in technical collaboration with three multinational companies, with Valio of Finland providing the technology for the lactose plant, Demro of USA providing design and machinery for the cheese plant and Shryber of USA providing technology as well its brand name for the export of casein.

One of the special features of the project is that it has sought to integrate the plant into the existing dairy cooperative set-up in Maharashtra. The Dynamix plant will have the capacity to process six lakh litres of milk per day, which will be supplied through the cooperatives operating in Baramati.

The company is importing milk collection equipment from France, which will be installed in 150 locations around an 80 km. periphery around its procurement area. It is also setting up support services for farmers, in the form of a demonstration farm, with 250 high breed imported cows, artificial insemination and veterinary facilities.

## HOFBRAU-KOOL BREWERIES

Beer guzzlers have yet another delight in store. The German beer company, Hofbrau has entered into a joint venture with Kool Breweries to launch the HB beer in India.

The owner of Kool Breweries, Damajit Singh said "this is a technical and financial agreement where the foreign collaborator has a 25 percent stake. The total capital cost is Rs.18 crore and Hofbrau is bringing in Rs.4.5 crore. We have signed a license agreement to manufacture and sell HB brands in India and export to neighbouring countries."

The company proposes to start its commercial production by October this year. "The company plans to produce 1, 50,000 hectolitres of HB beer in Dharuhera plant.

The joint venture company will increase its production according to the demand as the beer industry is growing at the rate of 20 percent per annum", said Mr. Singh.

## FRESHCO

Fresh Coconut Products Ltd. (FRESHCO) - India's first integrated value added commercial plant would be commissioned shortly at Kadupisserry in Trichur district of Kerala. In the first phase of the project, the company will manufacture products like Coconut Cream, Coconut Milk and Coconut Chutney Powders. FRESHCO also plans to bring out value added products from coconut like beverages, vinegar and spray dried coconut milk powder.

The technology for the project was developed by Regional Research Laboratory (RRL), Trivandrum (CSIR Unit and expertise and support have been provided by the Coconut Development Board, Ministry of Agriculture, Government of India. RRL conducted research for more than eight years to perfect the technology which was transferred to FRESHCO for commercialisation. The chief promoter of the project, Thomas Parappully, is actively involved in development of coconut value added products since last one decade.

The target consumer population for FRESHCO products is the middle class and upper class households in urban areas. Processed coconut cream would save a lot of manual labour and the advantages are convenience in usage, time saving, long shelf life, no cholesterol, pesticide residue free, nutritious and hygienic. Another important aspect is, no preservatives are used in its preparation.

FRESHCO's current production is from its existing pilot plant and its commercial plant at Kadupisserry will have a capacity to produce 3 lakhs tons of 200 ml per month. FRESHCO products have been test marketed in India and have received encouraging response. The company is concentrating on two markets simultaneously - institutional and household.

## AMUL /CAMPCO

Anand Milk Cooperatives Union Ltd. (AMUL) has submitted a proposal to take over the chocolate factory of the Mangalore-based Central Arecanut and Cocoa Marketing and Processing Co-operative Ltd. (Campco). Campco, in the meanwhile, has decided to place before the general body, Nestle India Ltd.'s proposal to take over its chocolate manufacturing unit on a lease

basis. "We have been in touch with Amul and held initial discussions with Dr Kurien. As they do not have sufficient manufacturing capacity, we are working out the possibilities of manufacturing Nutramul for them" said Mr Pramod Kumar Rai, Managing Director, CAMPCO.

Nestle has proposed to take over the chocolate unit on a lease basis for 30 years. In return, it has offered Campco a package of Rs. 20 crore in the beginning and Rs 6 crore in the second year, Mr Rai said. Campco has decided that it would remain in the market even if the chocolate factory is to be leased out to Nestle, he added. The management has also decided to explore the possibilities of exporting CAMPCO chocolates to the Gulf countries.

Currently it manufactures chocolates at its factory at Puttur, the biggest in South east Asia. It also manufactures chocolates for Nestle as well as exporting cocoa butter to Belgium, France and USA through a Bombay-based trading firm. Another 20 tonnes of cocoa butter would be directly shipped for the first time from the Cochin port shortly, said Mr Rai.

CAMPCO has tied up with the Singapore-based Orebi Far East Pte to export cocoa butter. Cocoa butter is used for the manufacture of chocolates and cosmetics. Campco is one of the major procurer of cocoa in the country. India produces roughly about 0.25 percent of the world's cocoa production which is about 24 lakh tonnes per year.

## MYSORE BREWERIES

As part of the silver jubilee year celebrations the Bangalore based Mysore Breweries Ltd. (MBL) is setting up a Rs. 20 crore brewery unit in Aurangabad with an annual production capacity of 1,00,000 hecto litres of beer. The foundation stone for this project was laid down by the company's vice chairman and managing director K.P. Balasubramaniam. The new unit will be styled 'Pal Distillery Ltd.' and will be a subsidiary of MBL.

MBL already has a brewery unit in Bangalore. Soon after the establishment of the proposed unit, MBL's annual production capacity of beer will go up to 3,00,000 hecto litres. In the new plant MBL will be producing the existing brands (Cobra Pals and Knockout) and new brands.

## HERITAGE FOODS

Heritage Foods (India) Ltd. (HFL) will launch a milk processing unit with a ca-



capacity of 25,000 litres per day at Anakhpalle near Visakhapatnam. With this, the company will have a total installed capacity of 1.65 lpd for chilling, pasteurising and packaging liquid milk. HFL would set up two more mini-dairies in Guntur and Nellore districts soon. The company's main dairy with one lakh lpd capacity in Chittoor district would commence production by February 1996. Fresh capacities were also planned at Kolar in Karnataka and North Arcot in Tamil Nadu for chilling and pasteurising milk.

#### DAIRY DEN

The merits of fresh soft ice-creams are catching up in India with the makings of a slowly spreading revolution. Fresh soft ice-cream has a far lesser air content as compared to the commercial ice-creams, thus giving the consumer more value for money. Its texture is the outcome of the advancement in the icecream technology.

The Dairy Den Gelateria, spread out in Gujarat, are the pioneers in bringing the fresh soft scoop ice-cream technology to India.

The unique selling proposition of this brand of ice-cream is freshness. The reason for this is not too far to seek.

Commercial hard ice-creams are manufactured in bulk, placed in cold storage, at the manufacturer's level, transferred to the distributor's cold storage and then finally transported to cabinets of retail counters from where they reach the consumers. Most of the commercial ice-creams are at least 60 days old before it reaches the hands of the consumer. Soft ice-cream is made daily on the premises and in front of the consumer. Hence they can at the most be four hours old.

Also, a 150 ml scoop of commercial ice-cream may weigh hardly 50 to 60 grams because of the high air content. As opposed to this fresh-soft ice creams are more value for money, since they have a far lesser air content and hence are more filling and satisfying, which makes soft ice cream a meal in itself.

The ice cream can be produced in an attractive designer range and flavours, with nuts, fruits, jellies, custards, creams, etc to suit the taste of every palate.

The company has pioneered this revolution here in India with the import of Carpigiani soft ice cream machines. The range of machines products of the famed Carpigiani of Italy, can make thick shakes, candies, lollies and serve as milk treatment plants besides producing soft and

scoop ice creams.

Dairy Den, besides being the pioneers in fresh ice-creams also supply these machines along with the technology. The machines along with the technology. The technology has been catching on widely in major cities like Amritsar, Chandigarh, Calcutta, Tatanagar (Jamshedpur). Bombay, Bangalore, Delhi and a host of other cities. This is just the tip of the iceberg, with the de-reservation of the ice-cream industry on the anvil, more change in the ice-cream industry is to be seen.

#### CADBURY INDIA

Cadbury India Ltd. is gearing up for the second round of the chocolate war. It will be introducing three new products in the snack-chocolate segment to take on Nestle's world-renowned brand, 'Mars' which is due for launch in India shortly.

Cadbury had recently introduced its snack bar 'Perk', a light wafer-chocolate, in direct competition with Nestle's launch of its well known brand 'Kit Kat'.

Although Cadbury officials refuse to reveal the exact sales of Perk, they said that the response has been encouraging.

Cadbury now plans to focus its attention on the snack-chocolate segment, to counter the threat from rival Nestle.

The company's new products for India will be chosen from Cadbury's international baskets of chocolates, and will be in keeping with the Indian climate. The chocolates will have five fillings of rice krispies and wafers.

Meanwhile, Cadbury has launched a programme to consolidate its dominant position in the Indian market.

Cadbury controls 80 per cent of the Rs 250 crore chocolate market in India, and owns brands like 'Dairy Milk', '5 Star' and 'Gems'. The rest, 20 per cent of the market is made up by Amul and Nestle. The chocolate market is estimated to grow by 15 per cent in 1996.

As part of its consolidation strategy, Cadbury India is planning to invest Rs 30 crore in 1996 in modernising and upgrading its manufacturing facility near Gwalior in Madhya Pradesh. The company has already modernised its plant at Pune at a cost of Rs 40 crore.

While funds for the Pune factory modernisation were provided by the parent company located in the United Kingdom, investment in the Gwalior plant will be made from the internal accruals of

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Cadbury India.

Cadbury's third factory located in Bombay has, however, not been included in the modernisation plan. Industry sources say that this is because of the high cost of modernising this plant.

Cadbury India is also focussing its attention on exports, and claims to be the first company in India to undertake the export of finished chocolates. So far, the only exports from India were in the form of Cocoa, which is the basic raw material.

For example, the company is focussing on the market in South Asia, and has already made inroads in Bangladesh as well as Sri Lanka. The company is also exploring market in West Asia and Russia. Its exports are expected to touch Rs 5 crore by the end of 1996.

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#### MOHAN MEAKIN

A mineral water plant in Solan by Mohan Meakin, with Belgian tie-up is set to enter the export market. The company's breakfast cereal business has been expanded following the entry of Kellogg's, the America multinational. Now it is set to introduce wheat flakes. Mohan Meakin Ltd, a north based company, has been diversifying into other regions and businesses besides the 140 year old distillery.

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#### HIMGIRI FOODS

Himgiri Foods has successfully implemented a modern project for frozen fruits and vegetables in Gujarat with technical assistance from Frigoscandia of Sweden. This is the first project of its kind in Gujarat with the individual quick freezing technology. The company has the advantage of an extremely sound foreign collaborator which has well established name the world over.

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#### MACDONALDS

Burger giant MacDonalds is coming to India with four of the largest snack food multinationals in tow - Lamb Western, Farm Fries, McCain, and a Dutch foods company - who will depend on it for the bulk of their business here.

Although Big Mac received clearance to enter India, it put its plans on hold following the controversy generated by swadeshi movement against Kentucky Fried Chicken (KFC) here. The recent court decisions in favour of KFC have apparently emboldened MacDonald to push a head with its Indian entry. The US-based reataurant chain is likely to open its first

outlet in Bombay.

The four snack companies will depend on MacDonald's chain of restaurants to crunch up their products. US-based Lamb Western is tying up with Terai foods for their project here. Farm Fries will join up with Quality Plantations in West Bengal. McCain will come in on their own. The Dutch foods company is still examining the possibilities in the Indian market.

Farm Fries will make an initial investment of \$ 10 million, McCain will pump in about \$ 20 million and Lamb Western between \$ 15 and \$ 20 million.

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#### INDIAN FOODS

Indian Foods Fermentation (IFF), a Madras-based company, is planning to produce potato-based products. Earlier, the company had launched a dosa machine and was selling its products under the brand name Magic Mom.

The company plans to spend around Rs. 4 crore on the expansion programme which will enhance the capacity of potato flakes and other product. IFF is in the process of working out the mode of finance. IFF will manufacture potato flakes, finger chips and ready-to-cook paticed powder. The flakes can even be used by 'Pavbhaji' ventures, he pointed out.

The company will concentrate on institutional markets. "We have avoided this segment but we noticed that even six big corporate houses can keep us busy. We will sell the existing products range like ready-to-cook dosa mix, vada mix, sambar powder, potato flakes etc," he added.

At the same time, the company plans to rope in Nestle for selling the products in the local market. Simultaneously, the company will also export dosa, patice, bondas and other items. The first consignment is likely to be dispatched to the US by early this year.

"I decided to go in for potato-based products because India is the fifth largest producer of potatoes in the world. The quality of Indian potatoes is among the best and we will keep our prices reasonable," he said.

The potato flake manufacturing facility which conforms to international standard, will have a per tonne cost of US\$ 600. The international cost is about double of that.

The company also plans to commision franchises in all the major metros. It plans to set up around 150 franchise outlets all over India by 1997.

The company has already set up outlets in Delhi, while marketing for other centres will commence soon.

"Though the targeted customer are from middle class, what we are, doing is just creating the right atmosphere by setting up fully air-conditioned outlets. However, the price will be between Rs 7 and Rs 12," Narayan added.

The company has already finalised a distribution arrangement with a leading distributor in the United States to tap the international market.

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#### PEPSI

Pepsi is planning to launch its product in cans to take on Coke's grand entry into the can segment during the forthcoming World Cup Cricket.

Coca Cola is the official drink for the World Cup 1996 and to cash in on the event the US cola major has decided to coincide its entry into the can segment with World Cup in February.

But the arch-rival-Pepsi as a counter strategy has made elaborate plans to fight off the challenges posed by Coca Cola, Pepsi sources say. Alarmed by the "Operation Trigger" of coke, Pepsi will unleash sleek advertisements in the next few weeks to promote its canned drinks.

"Our strategy will not be to overspend the competition, but to outwit them," say Pepsi sources. While Coke is expected to spend about Rs 12 crore in the mega-event by way of TV commercials, press insertions and billboards. Pepsi is expected to throw a surprise. "We have some plans up our sleeves to ward off the heat generated by the Coke as the official sponsor," say Pepsi officials.

Coca Cola has recently launched "Operation Trigger" as a prelude to World Cup. It has made a new commercial and booked prime time in most of the TV channels besides advertisements in other media.

Coke is expected to get a significant boost in its image following the mega cricket event. Coca Cola as one of the sponsors of the World Cup will have access to more exposure through the wide media coverage of the games.

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#### INERTIA INDUSTRIES

Interia Industries Ltd. (IIL) is putting up a 6,00,000-HL capacity brewery at Aurangabad, Maharashtra. This will be the group's second brewery, the first being



in operation for well over two years at Dharuhere in Haryana.

According to a spokesman of the ILL, the Aurangabad unit is expected to go on full steam latest by April-end and will introduce canned beer. Negotiations with UK-based can manufacturing company have been finalised for the purpose.

ILL's Sandpiper, Golden Glow and Turbo have already created niches for themselves in the highly competitive beer market at home and abroad.

The spokesman claims that nearly 70 per cent of the draft beer consumed in the Capital's clubs, hotels and other establishments, is supplied by the ILL. He told The Economic Times that except Tamil Nadu and Andhra Pradesh, Innertia beer brands are sold in all the states and Union territories. Recently, Innertia's beer found customers in USA, South Africa, Hong Kong and UK. The maiden consignments of ILL's beer have already been dispatched to these countries.

## NILGIRI DAIRY

Nilgiri Dairy Farm Ltd is to carve out a separate franchise division and is also planning a joint venture with a leading store in Singapore. C Gopalakrishnan, Director, Nilgiris, Franchise Division, Nilgiris, said. Besides this they intend to go public with an issue worth around Rs 10 crore by September.

The new franchise division which will be set up with an investment of Rs. one crore will be a separate entity and will have the right to use the name Nilgiris, besides setting up their manufacturing unit.

"We are talking with two well established stores, P G Govindswamy Pillai popularly called PGP Stores, and Kuna Stores in Singapore for a possible 50:50 joint venture including management participation," he said.

## REGENT AGRO

Come April, Hyderabad-based Regent Agro Products Ltd. will market coconut water in tetra packs. Called 'Coco Sip' the 250 ml tetradrink is competitively priced at Rs. 6 with other fruit and soft drinks. The company will also launch coconut milk as a fun beverage and a food additive.

In contrast to fresh coconut water which starts fermenting within hours the aseptically treated coconut water packaged in tetrabrik packs retains its nutritional value and has a shelf life of six months without refrigeration, claims the company.

Regent Agro Products will introduce a range of value added processed coconut products including coconut milk, coconut oil, shell powder, dessicated coconut powder, fibre and coir using the wet processing technology.

"We are investing Rs. 30 crore in an integrated processing plant at Rajahmundry in Andhra Pradesh which has a capacity to process 40 million coconut annually," says a Regent Agro Products spokesman. The company expects to utilise 50 per cent of the installed capacity of 10 million tetrabrik packs in the first year. The company plans to set-up another plant in Tamil Nadu in 1997 which will have a capacity to process 75 million coconuts.

Regent Agro Products is sourcing the processing and packaging technology from Alfa Laval (India) Ltd which has a tie-up with \$ 1.16 billion Swedish International major in liquid food packaging technology, Tetra Pak. The processing technology was first developed in late eighties in Singapore by Alfa Laval for processing coconut cream and coconut milk and was well received in the South East Asian markets like Indonesia and Philippines. Tetra Pak's other Indian clients include Parle (Frooti) and Godrej (Jumping Mango and Tomato Puree).

## RAJASTHAN BREWERIES

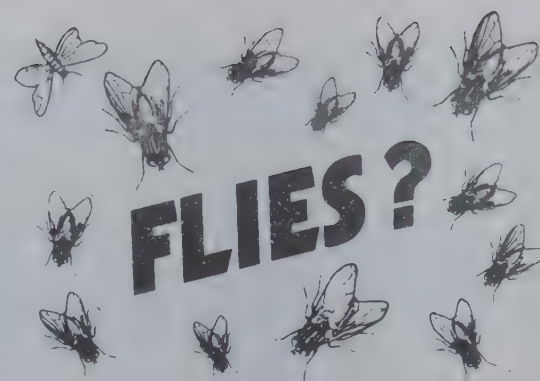
The Alwar-based, Rajasthan Breweries has entered into a 'strategic alliance' with Cadbury's to manufacture and market the international brand of 'Schweppes' drinks in India.

The local partner, which is also canning the Stroh's brand of beer in India, would also market Cadbury's canned products nationwide.

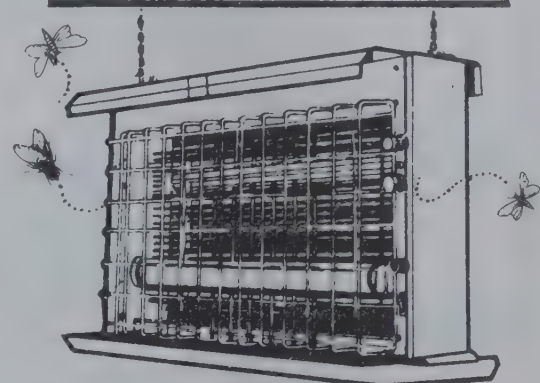
According to Rakesh Jain, Chairman of RBL, the canned drinks will be available in India under the 'Schweppes' brand name and it will be initially launched in Bombay and Delhi by the first week of April. "Subsequently, the drinks will be marketed in other parts of the country by the end of this year," he said.

Cadbury's entered the Indian market last year with its famous brands like Canada Dry, Crush, Bitter Lemon Tonic water and soda water packed in both bottles and cans.

According to Jain, both the companies have signed the deal last week in Bombay and RBL will shortly start manufacturing from the concentrate imported from the United Kingdom. "The arrangement is similar to a bottler, the only difference is that we will be canning the product and



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marketing it too," added Jain.

The company wants to take advantage of the summer season when the sales of soft drinks reached its peak, similarly the company will also explore the possibility of exports, he said.

Schweppes is also planning to launch its other world famous brands like Sunkist and Dr Pepper, Crush has already grabbed a market share of 30 per cent in the orange segment (where the drink has been launched) while Canada Dry and other beverages command a market share of 10 per cent.

RBL is already canning Stroh's beer in its plant and has emerged as the leading canning company in the country. The ultra-modern canning plant built by RBL is presently the only plant in the country, though both Coca Cola and Pepsi have plans to set up their own canning plants.

Jain added that a separate marketing team will be constituted by RBL which will be supplimented by Cadbury's own team.

### TEEJAN BEVERAGES

Teejan Beverages Ltd, the Indian subsidiary of the Oman-based Teejan group, is setting up a Rs two crore mineral water bottling plant at Meloor in Kerala.

The project is a joint venture between Teejan group and KSIDC, which will hold an 11 per cent equity stake, KSIDC will also extend a term loan Rs 60 lakh.

The plant will have a production capacity of three million bottles per annum, Commercial production is expected to begin by April 1996.

The Oman-based Teejan group recorded an annual turnover of Rs 40 crore (1994-95).

Its range of businesses include laboratory engineering services construction, gas and thermal insulations, cleaning products, sun control and decorative films, ice-creams etc.

Kerala State Industrial Development Corporation Ltd. (KSIDC) is the nodal agency committed to developing industry and promoting foreign and domestic investments in Kerala.

KSIDC is the focal point of contact for potential investors as it provides project ideas, venture counselling and assistance with statutory approvals.

### KOTHARI FERMENTATION

Kothari Fermentation and Biochem Ltd., incorporated on 26th December, 1990, is backed by experienced directors on its board and professional personnel. It is a public limited company, listed on leading Indian stock exchanges. The Company has its paid-up capital of Rs. 6.09 crores and financial participation of Rs 6.20 crores from IDBI and Allahabad Bank in the form of term loans.

The company has set up "Yeast & its Derivatives" plant, with latest technology at Sikandrabad, Dist. Bulandshahr (U.P.), about 50 kms. away from New Delhi. The plant has a capacity to manufacture 5500 M.T. per annum of equivalent compressed yeast. It is a multi product unit manufacturing baker's and Distiller's - Fresh Compressed yeast, Active Dried Yeast, Instant

Dried Yeast, Inactive Dried Yeast, Distiller's Yeast Improver, Yeast Extract Paste and Yeast Extract Powder. The company has taken lead in manufacturing Instant Dried Yeast.

The brand names - "SUNRISE" and "FOUR SEASONS", well recognised in Indian market, have been approved in Europe, Japan, UAE and other countries and export to these countries will commence shortly. Export to neighbouring countries has already been started.

The company has a well equipped R&D Laboratory and a team of talented scientists and engineers constantly working to develop technologies, and yeast based biochemicals needed for bakeries, Distilleries, Food, Pharmaceutical & Biotech industries.

Kothari Fermentation is also engaged in domestic and international trading of commodities, which has profitably imported and exported commodities in the past year and has plans to expand its trading activities in the near future.

The company achieved a turnover of about Rs. 53 Crores upto Dec. 95.

The company is planning to diversify in the field of biotechnology in the near future and also expand its activities in domestic as well as global market.

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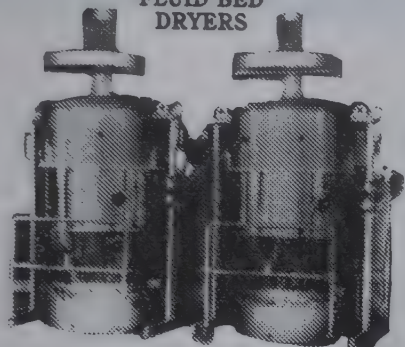
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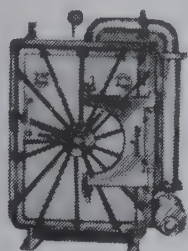


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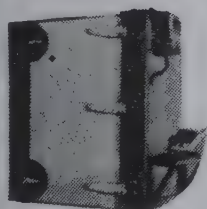
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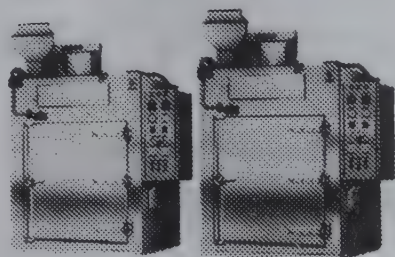
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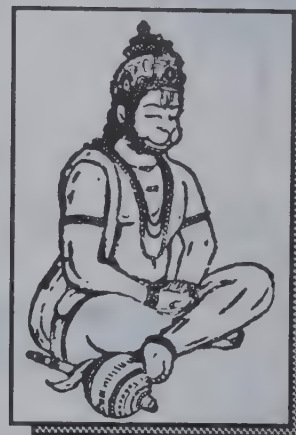
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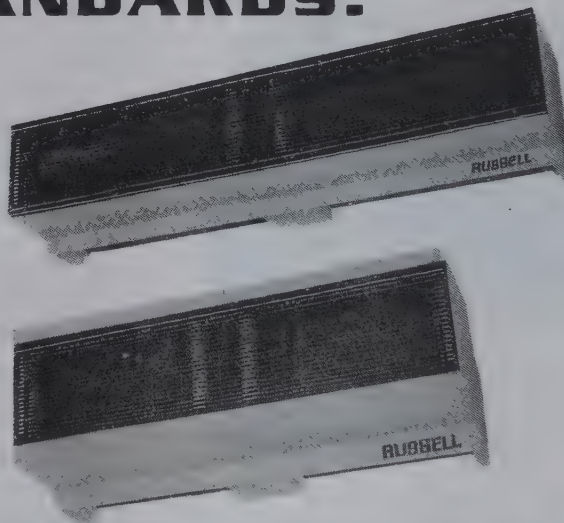
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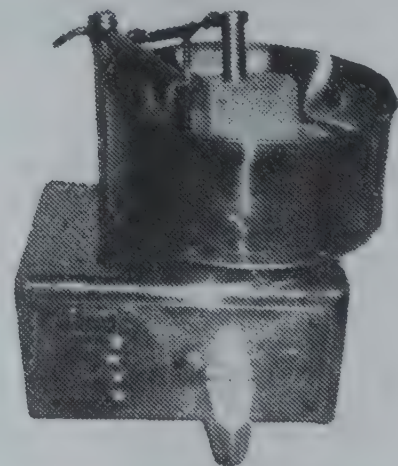
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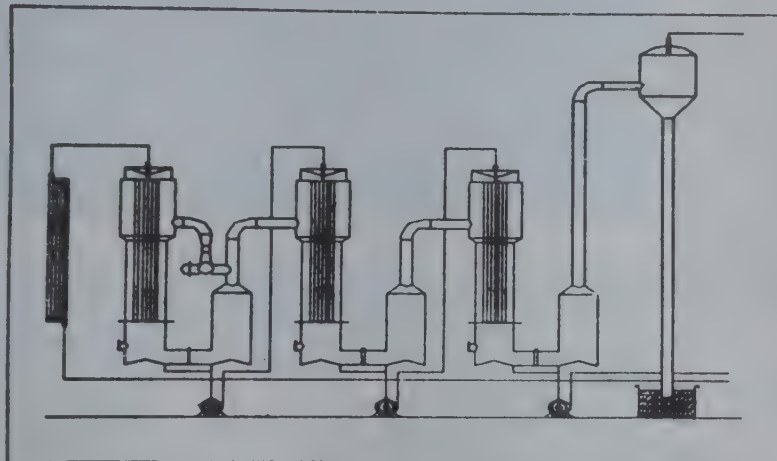
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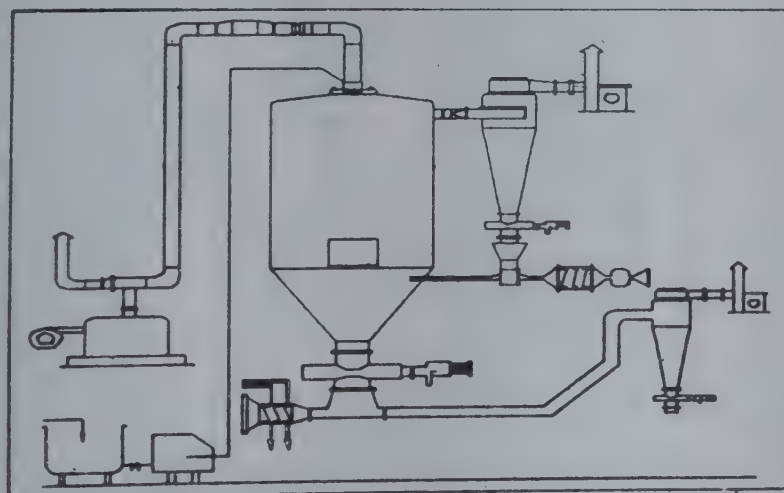
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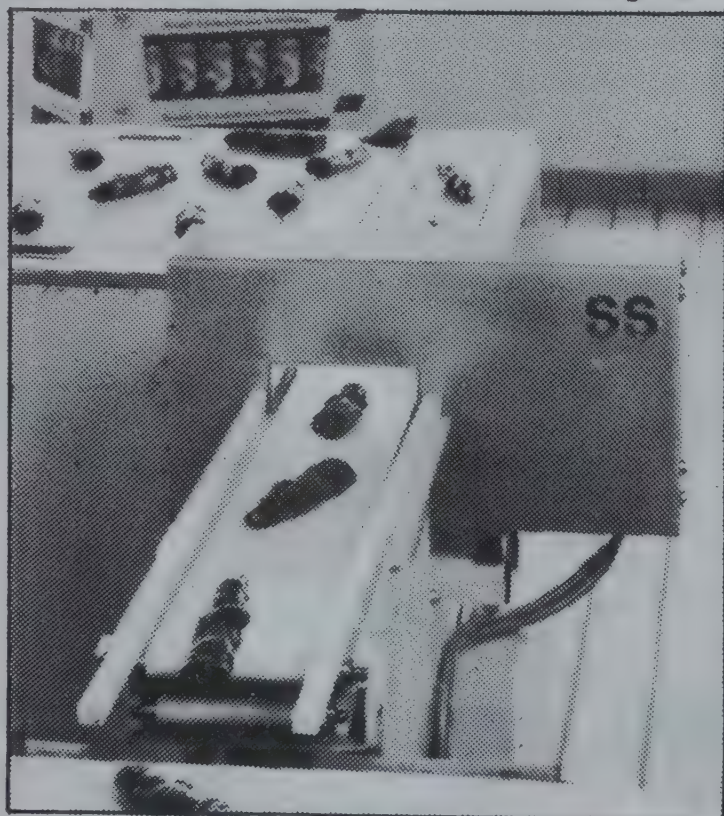


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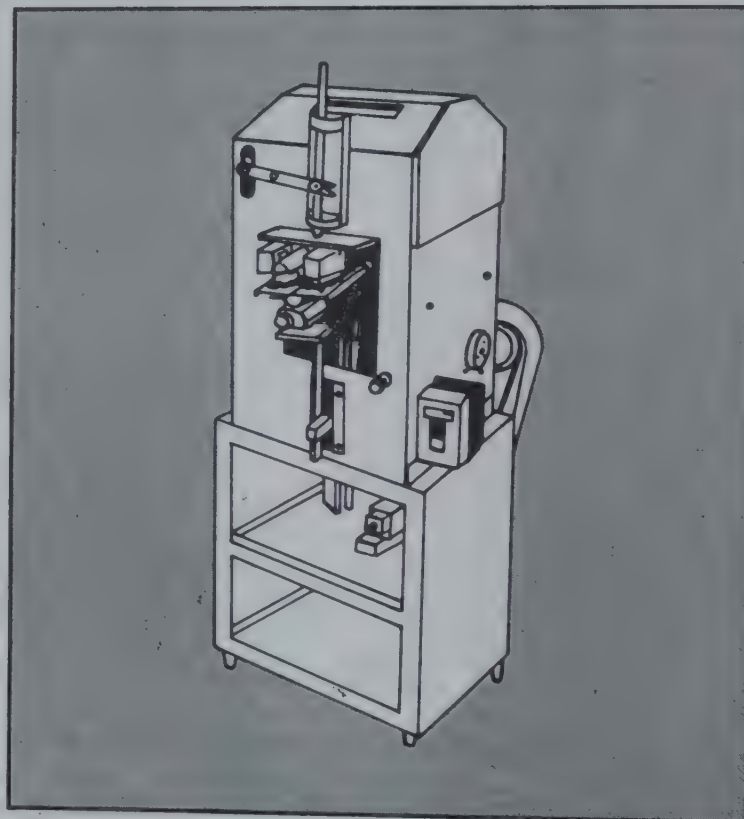
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# INDIAN EXPORT HIGHLIGHTS

## DAIRY PRODUCTS

India is the second largest milk producer worldwide, with a total production of nearly 60m tonnes of milk a year. The GATT agreement, which promotes free trade and goes against subsidies, has made India's milk prices competitive globally. In 1992, the growing world demand for milk and milk products reached US\$ 8.85 billion.

As S. Pandiaraj, Merlin Dairy's director of sales, says "cheaper cost and higher quality of India's dairy products plus good marketing research into development of new milk by-products would boost India's position in the Dairy Industry."

Ideal Vitamin Food Products Ltd has initiated a US\$ 7.87 million project to set-up a 100 percent export-oriented dairy plant at Tarapur, near Bombay. Utilising ultra-high temperature processing technology from Alfa Laval (India) Ltd, the proposed plants will have a daily installed capacity of 144,00 litres of milk. Products to be manufactured include vitamin enriched milk, skimmed milk, flavour milk and by products such as ghee, cream and butter. Commercial production will start in March 1996.

Ideal is also looking for suitable partners with an established distribution network to handle its local and international marketing. The milk products will be sold under the brand name 'Ideal Milk', with its main markets being the Middle East and Southeast Asia. Turnover in the first year, at 50 percent capacity utilisation, is targeted at US\$ 18.9 million.

Vadilal Dairy's newly completed project includes a dairy plant at Sinner, near Nasik with a production capacity of 3 million litres of milk a day. Products manufactured include white and salted butter, ghee and different variety of cheese. All products will be marketed under the brandname of Vadilal Dairy-rich. The facility is also designed to produce baby, skimmed and wholemilk powders. The total investment of this project touched 35 Crores.

Merlin Dairy Ltd. invested US\$ 1.8 million in a new dairy facility at Kolinjipatti

near Andayalur Gate, Kasipuram. This facility has an initial installed capacity of 70,000 litres of milk a day. All products from fresh milk to bi-products like butter, ghee and yogurt will carry the Merlin label. At a later stage, Merlin plans to manufacture lactose, skimmed and whole-milk powder. Fifty percent of the products are targeted for exports, particularly to Singapore and the Middle East.

## RICE

Returns from export of processed fruits and vegetables have trebled from Rs. 1.03 billion to Rs. 3.1 billion in the last four years and experts forecast a 30 per cent annual rise till 2000 AD, if nothing goes wrong with the rate at which agro-industries are growing and the investments they are attracting.

As many as 3,101 industrial entrepreneurial memoranda involving an investment of Rs. 391 billion (\$ 11.17 billion) and proposals worth Rs. 76.8 billion (\$ 2.16 billion) involving foreign investment and technology agreements for agro-based units have been approved, according to a study by Federation Chambers of Commerce and Industry (FICCI).

The food processing industry alone has already received \$ 83 million by way of foreign investments in the last four years, sources at Agricultural and Processing Food Products Export Development Authority (APEDA) say.

With internal and external demands for tinned food picking up, prospects for the country's 4,270 food processing plants are

bright with production expected to be 0.67 million tonne.

With foreign capital and technology inflows the sector is expected to see a lot of growth as is seen by the performance of few that have sprouted over the last decade.

The total installed capacity of fruits and vegetable processing industries is expected to increase to two million tonne by 1996-97, according to FICCI.

## TEA

Despite a shortage of 24 million kgs of tea, exports have risen by 19.29 million kgs during January-October 1995 to 126.19 million kgs against 109 million kgs during the corresponding period of 1994.

The uptrend in exports was also accompanied by higher foreign exchange earnings by Rs. 205 crore during the period, to Rs. 885,427 crore from Rs. 680.31 crore in 1994, leaving the tea industry more optimistic for the rest of the year.

## MEAT

India's multi-billion meat industry is growing fast, with export expected to touch Rs six billion, a 33 per cent increase in a year, but traders say an anti-meat trade could kill their business.

Accused of depleting the valuable cattle population of the country, they have called for a rational national policy on animal management which could save Rs. six billion from being wasted every year.

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# EXPORT OPPORTUNITIES

## BENIN

A.C. Akunze B.V., B.P. 08-0948, Centre de Tri, Cotonou. Tlx : 1120, Cable : AKUNRE B.V. Fax : 229-3138 09. Importers of Pharmaceutical Products & Antibiotics, Confectionery, Sweets.

## JAPAN

Cannon Impex, Incorporated, No. 1-13-35-907, Higashi Nakajima, Higashi Yodogawaku, Osaka 533. Tel/Fax : 06-323-1510. Wish to import Canned Sliced Pineapple in Natural Juice, 567 GM Can. Opp Clear/Brown Packing Tapes 50mm x 50 metres length. Kraft Packing Tapes, Kitchen Foil, Aluminium Foil.

## KUWAIT

Ashian Gulf Est., P.O. Box 51523, Riqqa 53456. Tel/Fax : (965) 3924574 are importers of all kinds of Foodstuff, Confectionery, Food Processing Machines, Potato Deep Frying/Filling/Cutting and Packaging Machines & Packaging Material.

## MAURITIUS

Patel Mag. Patel, 42, Joseph Riviere

Street, Port Louis. Tel/Fax : 230-464-2366. Importers of Foodstuff.

## PAKISTAN

Venus Corporation, 11, Rahman Chambers, Akhund A. Rahman St., Jodia Bazar, Karachi 2. Tel : 2441796, Tlx : 21106. Cable: VENUSTEA, Fax: (9221) 2434488. are interested in importing Milk Products and Skimmed & Full Cream.

## SINGAPORE

Dragon Emperor Services, Apt. Blk. 37, #02-307 Telok Blangah Rise, Singapore 090037. Fax : 65-2782040. Attn : G. Richards. Importers of White Garlic, Dried Sea Cucumber.

## SOUTH AFRICA

Transjay Import & Export (P) Ltd., P.O. Box 49278, East End (Durban) 4018, S. Africa. Tel : (031) 377766/9021593 (A/H), Fax : (031) 377633 wish to import Rice, Spices.

## SPAIN

Shivani Espanola S.A., P.O. Box 374, Malaga 29080. Tel : (34-5) 2319512-16, Fax : (34-5) 2349451. Importers of Exotic

Fruits, Spices.

## SYRIA

Orient Trading Co., Arnous Place, Dar Al Mouhandissn, Sabagh Building, 7th Floor, Damascus. Tel : 3321047. Fax : 00963-11-3331848. P.O. Box 34327. Importers of Aluminium Extruded Components, Enzymes, Food Products. Equipment.

## TANZANIA

Janali Hardware & Automart, P.O. Box 1467, Tanga. Importers of Machinery for manufacture of Crown Corks and Materials with Print.

## U.K.

Rothwell International, York House, Empire Way, Wembley, Middlesex HA9 0PA, Tel : 0181 900 0977; Fax : 0181 903 6203. Contact : Ms Harshida Amin. Importers of Tea and Rice.

Salimex Limited, 58 Godstone Road, Whyteleate, Surrey CR3 0EA, Tel : 0181 763 8232; Fax : 0181 763 8233 Contact : Mr. Andy Taylor. Importers of Wheat Flour, Rice, Rape Seed.

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# TRADE FAIRS & EXHIBITIONS

## F & B-TECH TRIPLE EXPO '96

Venue : Goregaon, Mumbai

Date : February 20-24, 1996

Excel & Communication Enterprises (India) Pvt. Ltd., alongwith ISC - Koln Messe, Germany — one of the world's leading trade fair organisations brings to you an international event. This synergetic event encompasses 3 major segments of special interest — Food Processing, Beverage Technology and Hospitality World.

F & B Tech Triple Expo '96 offers a unique platform for exchange of technologies and products. Display profile:-

**Food Process :** Processed Meat, Poultry and Fish, Edible Fats and Oils, Sauces, Snacks, Condiments, Cereals, Bakery & Confectionery and Chocolate, Processed Fruit and Vegetable, Processing Machinery and Equipment, Plants, Boiler equipment,

Preservatives, etc.

**Drinktec :** Beverages, aerated drinks, juices, alcohol, bottling machinery, processing machinery, etc.

**Hospitality World :** Kitchen equipment, crockery, cutlery, dispensers, bar accessories, furniture and furnishings, tableware, etc. etc.

*For stall booking, contact:*

Excel Exhibition & Communication Enterprises Pvt. Ltd., 206-210 Balarama, 2nd Fl., Bandra - Kurla Complex, Bandra (E), Bombay 400 051. Tel : 91-22-6442291/92. Fax : 91-22-6402117.

## HOSTS '96

Hotel & Food Service Trade Show

Venue : Mumbai, India

Date : 15 - 18 Feb. 1996

Now in its 4<sup>th</sup> year, this successful trade

show for the hospitality industry will cover an area of 80,000 sq. ft at Vallabhai Patel Stadium, Worli, Bombay. More than 1000 products will be on display, besides product launches, product demonstrations by leading manufacturers.

*Contact for more details :*

Ms. Pallavi Kashyap, Hosts '96, Hotel & Food Service India, 6/17, Grants Bldg., 2nd fl., 115 Arther Bunder Rd., Colaba, Bombay 400 005. Tel: (022) 285-1838 / 6859, 282 41 48 or Fax: (022) 285 6858.

## ROKA '96

Venue : Utrecht, The Netherlands

Date : February 25-28, '96

The theme of the exhibition is 'Focus on Food Trends'.

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supermarket sector, ROKA will be paying special attention to 'fresh produce'. Two separate halls have been reserved for this. Producers and suppliers of fresh products will be able to exhibit in this 'Fresh Hall'.

New innovations will be presented in the Plaza Nova. In comparison to ROKA '94, the surface area of this exhibit has almost doubled. Plaza Nova will assume the air of a 'Centre d'Art'. New products are to be displayed like artwork.

*For further information, contact :*

**Wim Weijmans, P & R Dept., Royal Dutch Fairs, Tel : +31 30 955507.**

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#### **FOOD INGREDIENTS ASIA '96,**

**Venue : Hong Kong**

**Date : March 4-6, 1996**

The Food Ingredients Europe '95 held in Germany in November last year was an outstanding success, with more than 650 exhibiting companies.

The Food Ingredient Asia '96 to be held at the Hong Kong Convention and Exhibition Centre, promises to be as great a success with exhibitors reflecting the increasing use of sophisticated technology to produce and use today's food ingredients.

*For more details, contact :*

**Miller Freeman BV, FI Europe Team, Tel : ++ 31 346 573 777, Fax : 31 346 573811.**

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#### **THE 1996 FMI INTERNATIONAL SUPERMARKET INDUSTRY CONVENTION AND EDUCATIONAL EXPOSITION**

**Venue : Chicago, Illinois, USA**

**Date : 5-8 May 1996**

For nearly 60 years, FMI's International Supermarket Industry Convention and Educational Exposition has been the food distribution industry's premier international event. The event features exhibits and educational seminars that offer a look at the industry as it stands today and where it is heading tomorrow.

New products, contacts and ideas are around every corner. From equipment and suppliers to perishables, grocery products and information systems - there is something for everyone. A dynamic exhibit floor highlights the industry's biggest names, as well as smaller companies featuring new and one of a kind products and services.

In addition, the U.S. Food Export Showcase, sponsored by the National Association of State Department of Agriculture and the U.S. Department of Agriculture's Foreign Agricultural Service, features another 400 companies displaying uniquely American

food product not found at other trade fairs.

*For further information, contact :*

**Food Marketing Institute, 800 Connecticut Avenue, N.W., Washington, DC 20006-2701 Tel: +1-202-452-8444 Fax: +1-202-429-4559.**

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#### **METPACK '96**

**Venue : Essen, Germany**

**Date : 7 - 11 May, 1996**

Metpack '96 - the world's premier show for the metal packaging industry has already received overwhelming support from both existing and prospective exhibitors.

"Essentially, there is no other opportunity for suppliers to the can making industry to hold live, practical demonstration to customers of their abilities on such a practical scale," said Mr. Andrew Wood chairman of the METPACK committee.

Metpack '96 will coincide with Interpack in Dusseldorf - the prestigious general packaging trade fair - on three consecutive days (May 9, 10 and 11).

A close working relationship between the organisers of both exhibitions guarantees many benefits for those wishing to visit either event. One example of this is a direct shuttle between Essen and Dusseldorf which takes less than 20 minutes.

*For further information contact :*

**Daniel O' Mahoney or Tony Bradley, Bradley O' Mahoney Public Relations. Tel: +44 (191) 281 8833. Fax: +44 (191) 281 4954.**

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#### **INTERPACK '96**

**14th International Exhibition of Packaging Machinery**

**Venue : Dusseldorf, Germany**

**Date : 09 - 15 May, 1996**

The global top transposition event in the world of packaging that is **Interpack** the 14th international fair of packaging machinery, is back after three years, bringing in great international demand. And it is a happy union of the global packaging market.

It is not only the biggest happening in the world for its industry, but also the most important communication forum. The fair is an opportunity for consumers, suppliers and decision makers from top management from all over the world to meet, exchange ideas and to discuss the current issues affecting every sphere of packaging industry.

In the year 1993, 2,236 companies participated in the fair and nearly 192,327 visitors attended the fair. In 1996 Interpack is expecting an even greater success.

**Exhibit Profile:** Interpack nomenclature covers no machinery or plants for the manufacture, finishing or imprinting of packaging material but packaging machinery in the strict sense. It includes 200 items for packaging machinery. That mainly touches the sectors like: ● Food and luxury food industry ● Pharmaceutical and cosmetic industry ● Chemical industry ● Confectionery industry ● Biscuits industry ● Drinks industry

Changing economic and technological trends of global significance are highlighted at the fair. In short, the tendency of future packaging markets and spurring development of technological innovations are projected at "Interpack".

A special group visit is organised by ORBIT for the benefit of packaging experts.

*For more details contact :*

**"ORBIT" 1127 Midway Premises, A.S. Marathe Marg, Prabhadevi, Bombay 400 025. Tel : 4379282 / 83 Fax : 4305705.**

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#### **FOODEX INDIA '96**

**Venue : Rotterdam, Holland**

**Date : April 24-27, 1996**

Products on view \* Fresh & Processed Fruits & Vegetables \* Cereals & Preparations \* Indian Snacks \* Spices \* Health Foods \* Tea \* Coffee \* Marine Products \* Animal Products.

*For more details contact:*

**India International Marketing Centre, K-7, Green Park Extension New Delhi 110016. Tel: 6968615, 6858327. Fax: 011-6867571.**

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#### **IMEGA '96**

**Venue : Munich, Germany**

**Date : September 21-25, '96.**

Imega '96, 4<sup>th</sup> the International Trade Fair for the Restaurant and Catering Industries and for the Food Trade, plays a major role as a platform for information.

Imega '96 offers the soft drinks industry an ideal platform for contact with partners from restaurant and catering industries and the trade in these countries.

Imega '96, will have Fast Food and Snacks as one of the themes of special interest. It will provide an overview of the international range of snacks and fast food. The product range is extremely international because fast food and snacks have long crossed all culinary frontiers.

*For details, contact :*

**Messe Munchen GmbH, Messagelände, D-80325, Munchen. Tel : (089) 5107-0, Telefax (089) 5107-506.**



# BOOK REVIEWS

**EVALUATION OF SEAFOOD FRESHNESS QUALITY** Series : Food Science and Technology Botta, J.R. Inspection Branch, Canada, Department of Fisheries and Oceans, St. Johns, Newfoundland, Canada. Published by VCH, P.O.Box 10 11 16, D-69451 Weinheim. Telefax (0) 62 01-60 61 84. 180 pages with 48 figures and 37 tables. Hardcover. Price: DM 138.00.

"Seafood Quality" describes the latest practical methods of assessing, measuring, and predicting the quality of seafood. Written by an expert in the field, who has nearly twenty years of experience in evaluating the quantity of seafood.

**Contents :** Chemical Methods of Evaluating Freshness Quality / Physical Methods of Evaluating Quality / Sensory Evaluation- Freshness Quality Grading / Sensory Evaluation : Attribute Assessment.

**CONCENTRATED AND DRIED DAIRY PRODUCTS** Caric, M., University of Novi Sad, Novi Sad, Serbia. Published by VCH, P.O.Box 10 11 16, D-69451 Weinheim, Telefax (0) 62 01-60 61 84. 249 pages with 98 figures and 34 tables. Hardcover. Price: DM 179.00.

"Concentrated and Dried Dairy Products" presents a comprehensive overview / review of the very latest techniques used in manufacture of concentrated and dried dairy products, covering all practical and theoretical principles as well as the relationship between technology and quality.

**Contents :** The manufacture of concentrated and dried dairy products / Unsweetened condensed milk / Sweetened condensed milk / Other condensed milk products / Milk powder : General production of specific products / Infant formulas Miscellaneous dry products / Whey / Casein / Lactose.

**FROZEN FOOD TECHNOLOGY** edited by C.P. Mallett. Published by CTI Publications Inc. 2619 Maryland Avenue Baltimore, MD 21218-4547 USA. 339 pages, 1992, Hardbound. Price : \$ 131.00 Outside USA via Air mail

This book is written for the professional

food technologist in the Frozen Food Industry. The first part of this book covers the basic aspects of the industry that are important to all the specialized sectors. Authors discuss the physics and chemistry of freezing, mechanical and cryogenic freezing methods, product safety and hygiene, packaging, and the use by the consumer of frozen food (particularly the growth of microwave re-heating).

**TOMATO PRODUCTION PROCESSING & TECHNOLOGY** by Wilbur A. Gould Ph. D. Food Industries Consultant, Executive Director Mid-America Food Processors Association. Published by CTI Publications Inc. 2613 Maryland Avenue, Baltimore, MD 21218-4547 USA. 550 pages, 1992, Hardbound Prices : \$87.00 Continental USA - Shipping Via UPS; \$104.00 Outside USA

**Contents : Part : I Production :-** Ch. 1. Introduction and History of the Tomato Industry. Ch. 2. Tomato Culture and Production for Processing. Ch. 3. Genetics in Breeding of Processing Tomatoes. Ch. 4. Tomato Harvesting Systems and Methods. Ch. 5. Tomato Handling. Ch. 6. Tomato Grading. Ch. 7. Preparation of Tomatoes for Processing

**Part II : Processing :-** Ch. 8. Canning Tomatoes. Ch. 9. Tomato Juice Manufacture. Ch. 10. Tomato Pulp and Paste. Ch. 11. Tomato Ketchup and Chili Sauce manufacture. Ch. 12. Tomato Soup. Ch. 13. Tomato Wastes. Ch. 14. Quality Assurance.

**Part III : Technology :-** Ch. 15. Quality Control. Ch. 16. Quality Evaluation of Processed Tomatoes and Tomato Products. Ch. 17. Colour and Colour Measurement. Ch. 18. Tomato Solids. Ch. 19. Viscosity

(Consistency) of Tomato Products. Ch. 20. Total Acidity and pH. Ch. 21. Defects and Material Other Than Tomatoes. Ch. 22. Flavor and Flavor Evaluation. Ch. 23. Drosophila and Insect Control. Ch. 24. Mold-Counting Method and Principles. Ch. 25. Spoilage of Canned Tomatoes and Tomato Products. Ch. 26. Composition of Tomatoes.

**DAIRY STARTER CULTURES :** by Cogan, T. / Accolas, J.P., Author/Editor Affiliation : Nat. Dairy Products Res., Fermoy, Cork, IR; Sta. de Recherches, Jony-en Josas, F. 1995. Ca 350 pages. Hardcover. Price: DM 148.00.

This is the only book available that provides an integrated picture of what starter cultures are and what they do. It gives an up-to-date discussion of the characteristics, metabolism, production, and role of starter cultures in the manufacture of fermented dairy products.

It further integrates recent developments in starter culture genetics into different aspects of culture metabolism, to give a comprehensive treatment of the subject. The contributors of the book are internationally recognized experts in dairy microbiology.

**From the Contents :** History of Cultures / Starter Genetics / Metabolism / Types of Culture / Bacteriophage / Other Inhibitors of Growth / Commercial Production of Cultures / Role of Cultures in Ripening Cheese / Special Additional Cultures / Future Prospects of Culture Improvement / Methods used with Starter Cultures.

Food Scientists / Food Technologists / Microbiologists / Food Industry / Graduate students will find this book of immense value.

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About 5 Lakh people are directly and indirectly engaged in this industry.

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Marketing is done through a novel scheme of secret Daily Tender System. Buyers, who are registered with **SAGOSERVE**, offer rates for each lot. The highest rate is confirmed at the option of seller on the same day. Maximum 45 days allowed to lift goods as per terms and conditions. Every day about 400 lots of Sago and Starch of various grades are displayed in tender, given sufficient opportunity to the buyer, to select the quality & quantity of his choice at a reasonable price. Besides, direct marketing is also done on receipt of advance payment for goods with minimum service charges. Credit facilities are available against Letter of Credit or Bank Guarantee.

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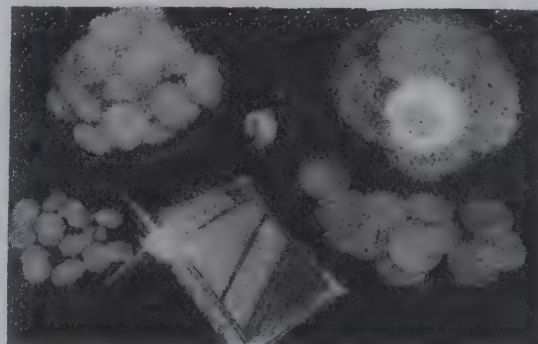
## USES OF STARCH :

Tapioca flour (Starch) is employed as a feedstock by industries making products such as glucose and its derivatives, soup candy, alcohol, pudding, sausages, bread, ice creams, paper, noodles, vermicellis and other fancy foods, textiles, detergent, medicines etc.



## USES OF SAGO :

Sago is a foods item in preparation of Khichadi, Keer, Pudding, Chiwda, Pappad, Halva, Pakoda, Vadai, Puri, Laddu, Chikki etc.



For further details, please contact

**SANDEEP SAXENA, I.A.S.,**

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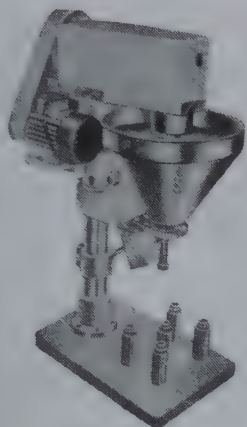
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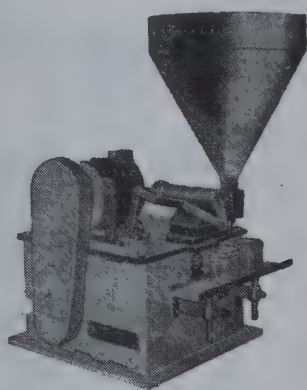
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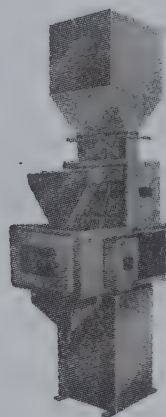
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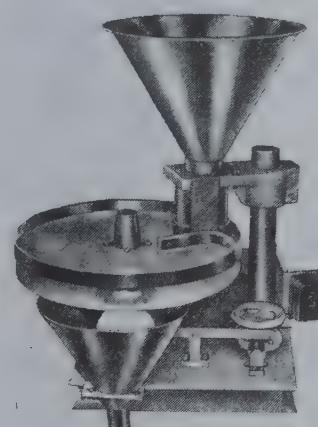
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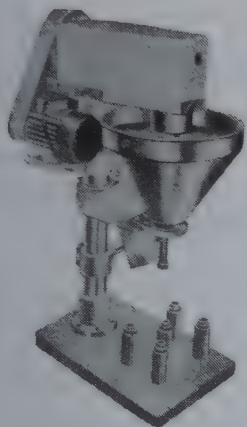
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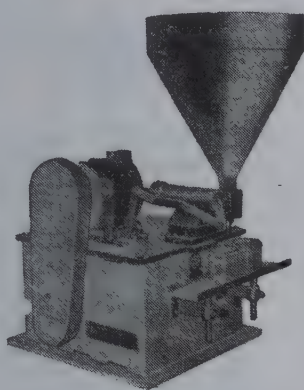
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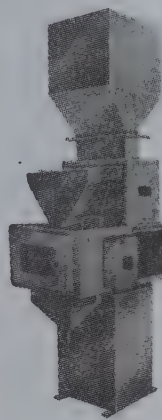
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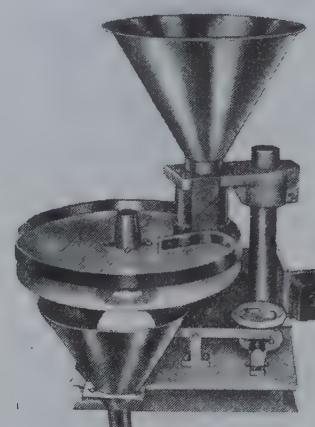
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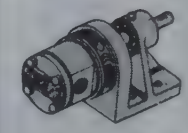
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- ★ Brewery & Beverage Industries
- ★ Chemical Industries
- ★ Water Treatment
- ★ Starch Industries
- ★ Dairy
- ★ Solvent

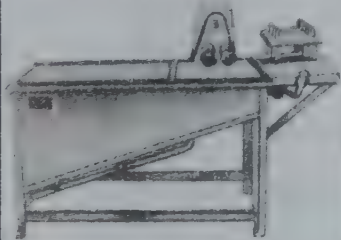
**union  
ENTERPRISE**

113, NAGINDAS MASTER ROAD, FORT, MUMBAI-400 023.  
TEL : 267 1368 ★ 267 6560 ★ 267 5316 ★ FAX : 267 4071

SQUARE

# ONLY PLACE FOR LIQUID BOTTLING MACHINERY

#### BOTTLE WASHING MACHINE



- Brush type with S.S./ Aluminium tank
- Output : 10,000 / Shift

#### BOTTLE FILLING MACHINE



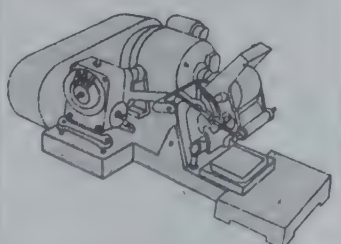
- 5 ml -1 Litre
- Complete S.S. Body
- Output : 10,000 Bottles/Shift

#### BOTTLE SEALING MACHINE



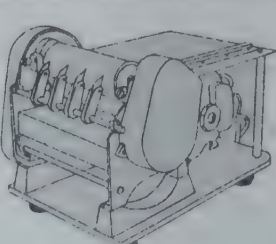
- Hand/Motor Operated
- For 8-35 mm ROPP Caps
- Output: 10,000 / Shift.

#### BATCH/CODE PRINTING M/C



- Hand Operated / Motorised
- Output: 10,000 / Shift

#### LABEL GUMMING MACHINE



- Motorised
- Output: 10,000 / Shift

#### PACKING CONVEYER M/C



- 8-10-12-16 Ft.
- With Sunmica/S.S. Top
- Speed as per requirement.

#### APPLICATIONS :

- Syrups
- Squash
- Sauce
- Vinegar
- Liquors
- Oils
- Cosmetics etc.

#### OTHER PRODUCTS:

- Filtration Unit
- Stirrer
- Storage Tank
- Transfer Pump
- Powder Processing Machinery



**PHARMACO MACHINES**

GR. FLOOR, PANDIT HOUSE, BEHIND NAGRIK STORES, STATION ROAD, THANE-400 601. INDIA.  
PHONE: 533 2245 / 536 3722. FAX: 91-22-533 1084



# PRODUCT REVIEWS

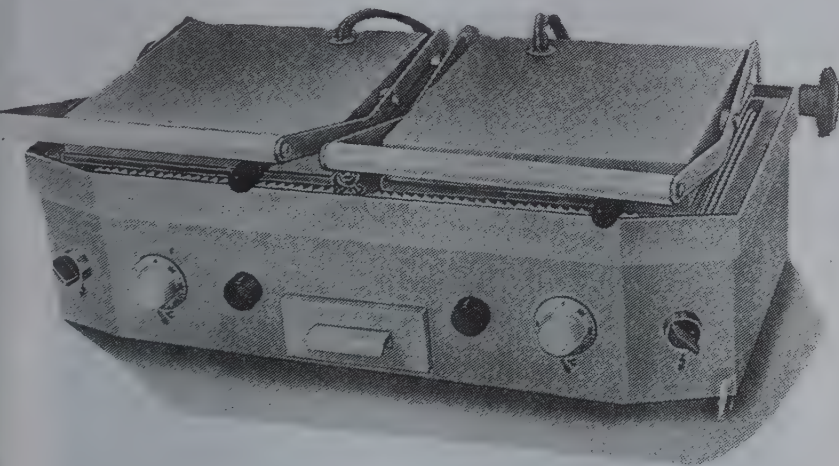
## SANDWICH GRILLER

Grilling couldn't be easier! Introducing the Dairymac Sandwich Griller which has all that the others do not.

Some of the salient features of our Griller are :

- Uniform cooking temperature across the griller
- An extra thick cooking plate of steel of high thermal conductivity to ensure excellent and uniform heating
- Adjustable height of the top plate to incorporate variable thickness of the product
- All external surfaces, including switch panel are in AISI 304 stainless steel.

The Dairymac Griller with its features makes it one of the best and most important, its delivery period is among the fastest in the industry.



For more details contact :

**Dairymac Engineering Pvt. Ltd.**

25 Madhuvan,

Ellisbridge

Ahmedabad 380 006

Tel.: 461205/402046 Tlx : 121-7157 DDPL IN

Fax : 91-79-443537

The result ! Superior spray dried products to meet international quality requirement.

SSP also manufacture flash dryer which are suitable for drying of a wide variety of materials. The material is dried in a stream of hot gas which pneumatically leads the material through the body of the dryer. This is unique in SSP flash dryer which makes it possible to position the dryer near the process while the product storage area may be as far as 200 feet away.

In a flash dryer, the material comes in intimate contact with the gas steam for a very short times which makes it ideally suitable to remove free moisture from the surface of the material. A single exhaust fan, located on the clean gas side of the dust collector, is used to induce the flow of the gas through the heater, uptake pipe, horizontal duct and dust collector separator. If required, a cage wall fan can be used as a lump breaker to disintegrate the larger agglomerators. For dust collection and separation, cyclone or fabric filter are used.

The SSP flash dryer can be easily adapted for closed cycle operations due to its flexible design and operating technique.

SSP flash dryer are available in carbon steel, in stainless steel and in other alloys.

The flash dryer finds application for \* Bleach clay \* Pigments \* Chlorinated clay \* Organic salts \* Dicalcium phosphate \* Starch \* Gluten \* Mica etc.

Other products from SSP Pvt. Ltd. are fluid bed dryers, spin flash dryers, rotary dryers, soya milk machines, stillage treatment plant.

*For Further information, please contact :*

**SSP Pvt. Limited**

13, Mile Stone,

Faridabad - 121 003

Telephone : 0129-275968/277442

Fax : 0129-277441/011-6847665

Telex : 0343-286 SSP IN

## STAMULCOL

## SPRAY DRIERS

Does SSP stands for Superior Spray (dried) Products ?

This question is asked by some of SSP's spray dryer owners.

SSP dryer produces instant granular powder with enhanced wettability and sinkability properties. The same dryer can even produce lighter fluffy powder. SSP dryer has a special cleaning device with winch mechanism. The unique feature of SSP dryer is the possibility of enhancing the existing capacity by 100 %.

SSP spray dryer is the only dryer which can handle multiple products ranging from SMP, WMP, Dairy Whitener, Icecream Mix Powder to the extent of viscous products like malted milk.

Even sugar products do not stick in the dryer which leads to less down time, less man power requirement, less product loss.

A wide range of processed foods needs to be emulsified and stabilized in order to enhance their mouth-feel, appearance and shelf-life. The use of various hydrocolloids or water soluble polymers to achieve such stabilization has been practised for numerous years by food processors.

In order to achieve complete functionality, often, no single product can be really recommended as an ideal stabilizer. STAMULCOL was developed to overcome this problem and to offer food processors a complete "stability package". STAMULCOL is a speciality food stability and support system.

STAMULCOL is a standardized blend of various hydrocolloids, covering natural Gums such as Guar, Karaya, Arabic, Starches - both native and modified, synthetic and semi-synthetic polymers like CMC, MCC, sea weed extracts such as



Carrageenans, Agar, Alginates, Gelling and other ingredients generally classified as "Gums"

Also available ex-stock : PECTIN - Herbstreith & Fox (Germany), XANTHAN-Jungbunzlauer (Austria), CARRAGEENAN.

*For further details contact :*

**Indian Gum Industries Ltd.**

51, A Maker Chamber IV

5th Flr., Nariman Point,

Bombay - 400 021

Tel : 91-22-2852075-76-77

Fax : 91-22-2040393

## WATER TREATMENT PLANT

Aqua Filsep Inc. manufactures complete range of water and waste Water Treatment Plants. The company offers Pressure sand, Activated Carbon : Micron Cartidge Filter, Demineralisation, Softening plants, Reverse Osmosis, Electro-dialysis Plants, Ion Exchange Resins, Disinfectant Systems, Polyelectrolytes, Descaling, W.T. Chemicals, Effluent Treatment Plants.

*For further details please contact :*

**Aqua Filsep Inc.**

7, Retiwala Indl. Estate, H.A.Palav Marg,

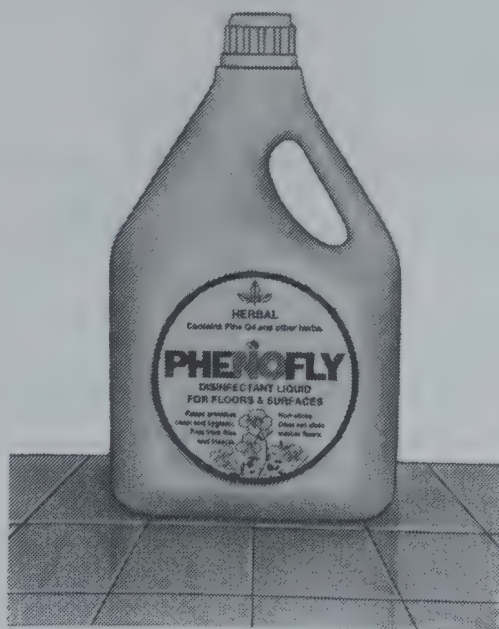
Byculla (East) Bombay - 400 027.

Tel : (O) 3719455 (R) 4465521

Fax : 91-22-3738436

## INSECTIDES

Ultima Search has a long standing reputation and experience of manufacturing household insecticides namely **Ratol** - The Rat Killer, **Kokron** - Kills Cockroaches, **Canon** (Smoke Generator)- for Insects Killing, and **Granol** - For Grain Protection from Insects. Backed by a full fledged factory and organised marketing, the company is selling their products in most of the states of India.



PHENOFLY Herbal is a scientifically formulated ready-to-use solution that is very effective in keeping off flies and insects from the premises. Useful for homes, offices, hotels, sweet meat shops, etc.

Ultima Search is an Association of well established organisation United Phosphorus Ltd. of high standing in agro chemicals markets since last 25 years.

Products of Ultima Search are widely used by Housewives, Commercial Institutes, Hoteliers, Shipping Companies and Storage Premises owners.

*For further details, write to :*

**Ultima Search**

Excel Estate, S.V. Road,

Goregaon (W)

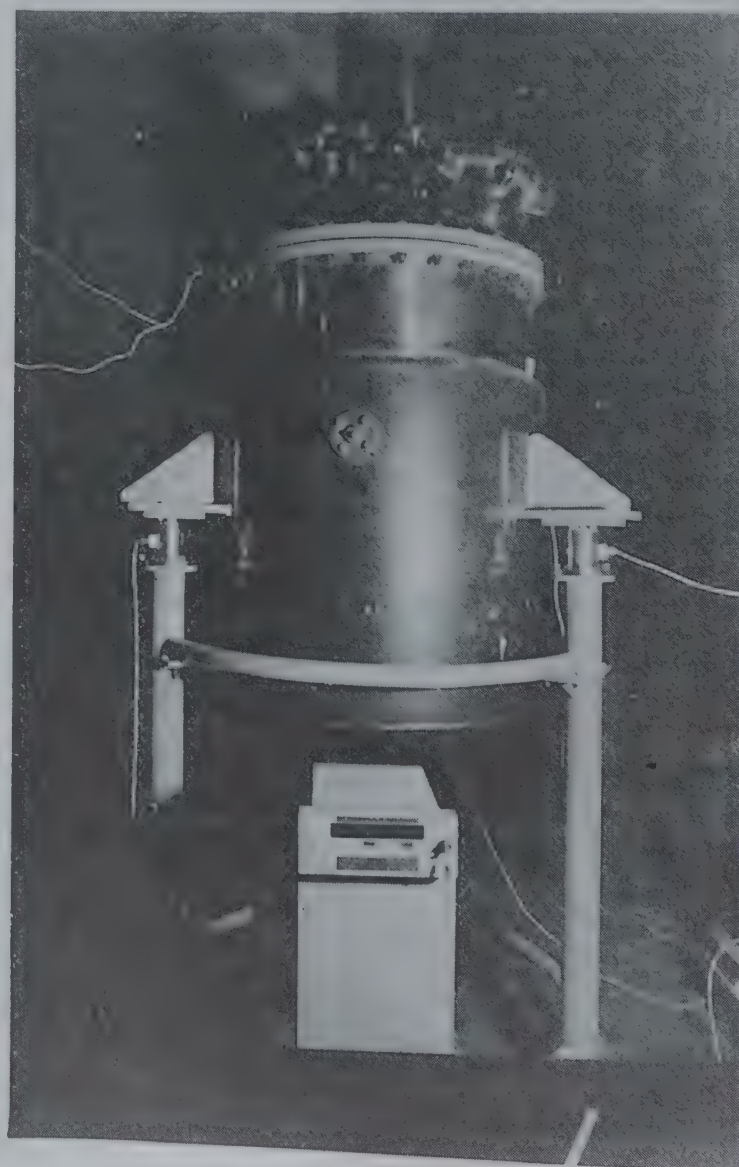
Bombay - 400 062.

Tel : 8751618, 872417

## BATCHING/LOSS OF WEIGHT SYSTEM

Epoch Instruments & Controls offers microprocessor based Batching and Loss of Weight System for Food and Beverages, Chemicals, Pharmaceutical Industries.

The Batching system carries out the Precision weighing of different ingredients. Once the Batching is over mixing operation begins for pre determined timings. After the completion of mixing, the microprocessor automatically switches over to the weight mode controller. In this mode predetermined quality of weighed material will be discharged from weigh hopper.





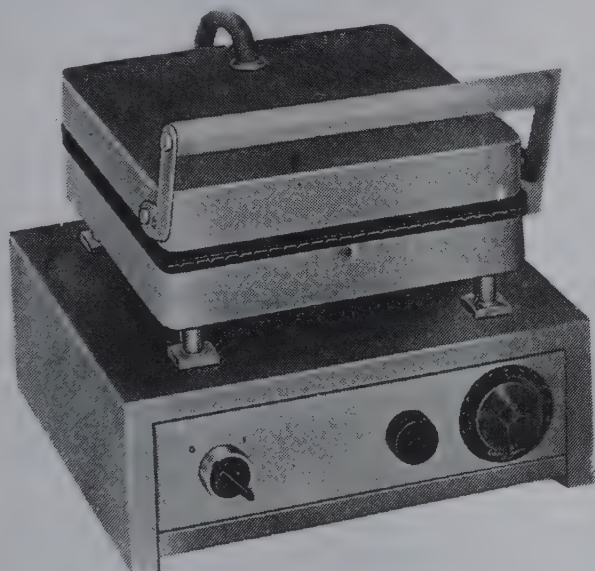
*For further information write to :*

**Epoch Instruments & Controls Pvt. Ltd.**  
1259, A-Wing 14th Floor, Mittal Tower,  
M.G. Road,  
Bangalore - 560 001,  
Phone : 5583303/3352723  
Fax : 080-5598268

#### WAFFEL-O-MATIC

In today's food industry - FRESHNESS is the key word. Freshly rolled sugar cones have already become a part of the Western World and yes, some enterprising Indian Entrepreneurs have started rolling in their margins.

The Waffel-O-Matic is specially designed to make Fresh Rolled Sugar Cones and Fan Waffel. Unlike other machines, this one has specially designed heating elements for uniform heating, the external surface, including the control panel, is made of AISI 304 stainless steel. An extra thick baking plate of high thermal conductivity ensures excellent and uniform heat distribution. It even has a thermostat and an indicator lamp to help making fresh rolled cones, child's play.



*For further details, contact :*

**Dairymac Engineering Pvt. Ltd.**  
25, Madhuvan,  
Ellisbridge,  
Ahmedabad 380 006.  
Tel. 461205/402046  
Telex : 121-7157 DDPL IN Fax : 91-79-443537

#### SOYAMILK

Soyamilk is preferred over all other summer drinks like Fruit Juice, Aerated Water, Flavoured Milk because besides quenching thirst it replenishes in NATURAL WAY all categories of nutrients (Proteins, Minerals, Vitamins, Carbohydrates etc.) which body loses when you are either sleeping, resting, sitting, working in the office or in an open field. Children and adults taking 400 to 600 ml a day have been found recovered from many deficiency disorders like protein - calories - malnutrition, under weight, anemia, acidity, fatigue, colon disorders, anorexia, amenorrhoea, constipation, blood pressure, summer diarrhoea, diabetes etc. Besides, soyamilk has been found a "complete

nutritious food" for newly born babies, infants, children who are suffering with primary or secondary Lactose Intolerance or are allergic to milk or its proteins or suffering with Cancer and can't take solid food. Soyamilk remains in good condition in sealed bottles for 3 to 6 months at ambient temperature.

Intrinsic nutritional qualities of soyamilk vary with the technology employed and type of seeds used to manufacture it. This is the reason why "Soyamilk" manufactured and marketed by "Soyghurt Food Products and Co. Nagpur (M.S.)" is the only soyamilk available in Nagpur market, in whole country, for past over 25 years period without interruption. During this period, six plants with foreign technology and collaborations were set - up.

"Soyamilk" is manufactured by employing indigenous technology and Plant & Machinery Development by Dr. S.L. Kothari, after years of field & laboratory research. Consumers of Soyamilk are themselves the promoters of the soyamilk because they have recovered from illness and also improved physically and mentally beyond their imagination and expectations at very little cost. New born babies consuming it from first week of birth are now grown up adolescents. Their body, health and intellectual abilities testify to what our bottle contains and quality of technology we have. Sale price of soyamilk is low because it is manufactured by an Indian scientist with self developed technology and plant machinery.

*For details contact to:*

**Soyghurt Food Products & Co.**  
Soyamilk Complex,  
Wardha Road,  
Sitabuldi,  
Nagpur - 440 012 (M.S.)  
Tel : 522 645.

#### CHEMICALS/PHOPHATES

Caxton Phosphates & Agro Chemicals Pvt. Ltd. are manufacturers of a range of chemicals such as Sodium Alginate, Alginic Acid, Agar Agar Powder & Strip, Mono calcium, Phosphate, Di Calcium Phosphate, Tri Calcium Phosphate, Light Magnesium Carbonate.

*For further details, please contact :*

**Caxton Phosphates Agro Chemicals Pvt. Ltd.**  
32 Hansraj Karamshi Building,  
70 Masjid Bunder Road,  
Bombay - 400 003  
Tel. 3750525/3753491/3752672

#### BARREL PUMP

P.P.Engineers had developed hand operated diaphragm pump for chemical process industries. This pump is ideal for corrosive Chemicals, Petroleum, Pharmaceutical and Food products. It can also handle liquids with fine suspended solids without damaging the pump. Thus it is the best alternative for rotary or piston type hand pump.

Liquid contact parts are made of polypropylene moulded or SS 316. Diaphragm is made of Neoprene or Teflon coated neoprene.



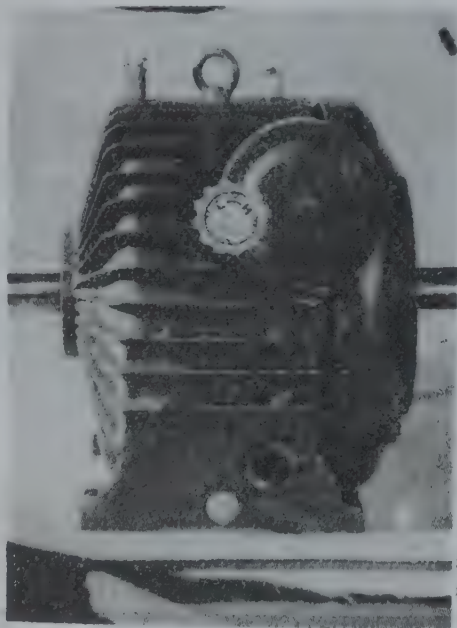
Pump has ZERO Leakage, because no seal or gland packing is required. Pump is self priming, portable. Can be mounted on skid or trolley.

*For further details contact :*

**P.P. Engineers**  
5, Akshar Dham,  
Opp. Naval Depot, Narayan Nagar,  
L.B.S. Marg, Ghatkopar (W),  
Bombay - 400 086.

#### STEPLESS SPEED VARIATOR

The new RAJ Mechanical Infinite Variable Speed Drive with its unique roller design, without any belt or chain offer reliable power transmission for wide range of industrial applications. It comes in 6 different sizes ranging from 0.25 HP to 30 HP. The minimum output speed 17th of input and maximum output speed being 1.7 times of input speed, i.e. total speed range is 12.1. It transmits the constant power and torque needed in the machine tool, chemical, paper, textile, plastics, sugar, cement, rubber industries wherever precise variable speed requirements met. It is most compact unit and its efficiency is very high as 92% throughout the total output range. It is stepless, slipless positive drive. C-Phase or flange mounted vertically or incline to another end. Speed can be controlled with a standard handwheel or with mechanical or electrical remote control. Also available are units for Vertical mounting or with built - in Gear Boxes. It can be used in flame proof areas.



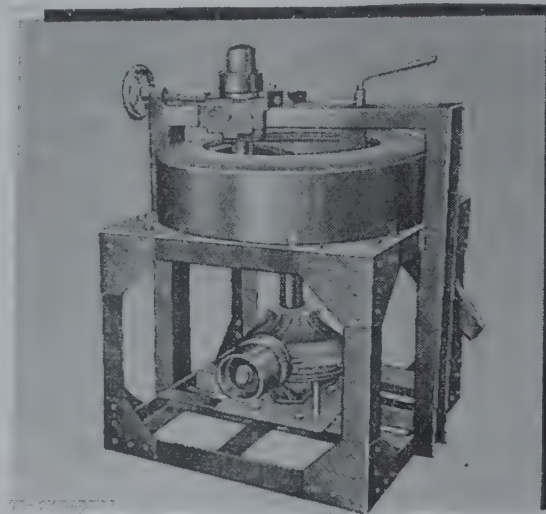
*For more details, write to :*

**Raj Engineers.**  
S/3, Raj Rajeshwari Apartment,  
Narayan Nagar, L.B.S. Marg, Ghatkopar (W),  
Bombay - 400 086.  
Tel : 512 7568.

#### POHA MACHINE

The Rice Flakes or Poha (Aval or Avalakki) Machine is for manufacturing Rice Flakes from Paddy. The types are **Pinion type** - with gear box facility, **Pulley type** - convenient to run number of machines together with a common Counter Shaft,

**Counter Shaft type** - occupies less space. The ancillary machines required are De-Stoner - for removing stones from Paddy, and Shaker or Vibrator - to clean Rice Flakes by removing dust etc, Paddy Roaster - to roast Paddy. The types are Electric Heater - with Electricity fuel, automatic controls. Results in high quality Rice Flakes. Continuous type Roaster - for high and continuous production - All machineries are available as per customer's requirements on capacity with proven quality and running successfully in India and abroad over three and half decades.



*For further details contact:*

**Durai Industrial Works**  
1143, Mettupalayam Road,  
Coimbatore - 641 043.  
Phone : Off : 0422-442380 Res : 0422-441777  
Fax : 91-422-442250

#### PACKAGING FILM

A manufacturer of Laminated Packaging Film, this company has been promoted by Samarpan Fabricators Ltd. leading manufacturer of Packaging Machinery in India.

Samarpan Converters Ltd. manufactures laminates in various combinations of BOPP, LDPE, Polyester, Metallized or Foil etc. The film is glossy, attractive and has got good sales appeal because of various colour combinations. S.C.L can supply them in clear and opaque form and in six colour rotogravure printing in a range of vibrant colours as per your choice.

*For further details please contact :*

**Samarpan Converters Ltd.**  
Plot A-182/A-183, Road 16/2,  
Wagle Industrial Estate, Thane - 400604.  
Tel. : 5321842, 5320822, 5320029  
Tlx : 011-72329 SFL IN  
Fax : 91-22-532 00 33

#### FOOD PROCESSING MACHINERY

The Company is engaged in the manufacture of :

☐ **Fruit and Vegetable Processing plants such as** ● Mango, tomato, papaya and guava processing plant. ● Pine-apple processing plant ● Grape processing and dehydration plant ● Orange, apple, lemon and pomegranate processing plant ● Mushroom processing plant ● Peas, green beans, carrot and other vegetables processing plant ● Jams, jelly, ketchup,



saucers, squashes, paste making machinery.

❑ **Snacks and Farsan making plants such as** ● Potato chips/wafers making plant ● Potato flakes and powder making plant ● Farsan items making equipments ● Peanuts roasting, coating and flavouring plant.

❑ **Milk and milk products making plants such as** ● Shrikhand, khoa, lassi and paneer making plant. ● Milk chilling and pasteurization plant.

❑ **Pickles, Spices & Oleoresin plants such as** ● Pickles and chutney making plant ● Spices and masalas equipments ● Oleoresin and spice oil making equipments.

❑ **Fish and Meat processing plants such as** ● Fish canning and freezing plant ● Meat processing equipments ● Fish meal plant and oil recovery equipments.

❑ **Health food products making plants such as** ● Amla processing and Chywanprash making plant ● Baby foods and other health foods making equipment.

❑ **Filling and Packaging machinery such as** ● Edible oil churns, handling and filling machinery ● Lubricants, greases, paints, adhesives packing machinery ● Pulps, juices, cosmetics, toiletries filling machinery.

*For further info, write/contact :*

**Sangram Engineering Ltd.**  
B-5 Supercon, Opp. ITI, Aundh,  
Pune - 411 007.  
Tel. : 366935, 342302  
Fax : 349673

#### Other Products :

- Rotary Airlock Valves ● Horizontal Unloading Valves
- Divertor Valves ● Flap Valves ● Screw Conveyor
- Ribbon Blender ● Industrial Fans ● All Metal Detector / Separator ● Packaging Machines.

RIECO through its longstanding experience has acquired capability to design, manufacture and supply the systems for agreed performance characteristics, involving above equipments and related accessories.

RIECO has established customer oriented test facilities to establish design parameters for pulverising of various materials, dust collection system and Pneumatic Conveying Systems. The testing laboratory is equipped with sophisticated measuring equipments. RIECO has access to a vast databank received from collaborators. Its Research & Laboratory is recognised by Council of Scientific and Industrial Research.

RIECO has successfully designed, manufactured, supplied, erected and commissioned various systems for different fields of applications.

*For further details contact :*

**Rathi Industrial Equipment Co. Ltd.**  
Office : 1162/2, Shivaji Nagar,  
Behind Observatory,  
Pune-411005,  
Tel. : 325284, 325215 Tlx. : 0145-7798 RICO-IN  
Fax : (0212) 323229.

#### PECTINS

Aditi Pectins offers standard quality Citrus Pectins, Lime Oil, which are major ingredients in Food Industry. Other Lime products viz. Calcium Citrate, Sodium Citrate, Lime Juice Concentrate/ Squash etc. are also in high demand.

The Company manufactures a wide range of fruit products, such as Pulps, Bars, Squashes, Juices of Mango, Banana, Strawberry, Pineapple etc. and Tomato ketchup, puree paste.

These products can be supplied in consumer packs or bulk quantities, as per requirement.

Distributors and Exporters are welcome for regular requirements.

*For details, please contact.*

**Aditi Pectins Pvt. Ltd.**  
M.I.D.C.  
Plot No. B/8, Islampur 415.409.  
Dist. Sangli (M.S.)  
Tel : (02342) 22343, 22348, 57550.  
Fax : (02342) 23064.

#### METAL DETECTION EQUIPMENT

The Food Industry has relied upon Eriez Magnetics for more than 50 years. ERIEZ - world authority in magnetic, vibratory and metal detection application - manufactures a wide range of equipment to separate, size, clean, sort, feed, convey and inspect, which are typical of most food processing applications.

Eriez Magnetics offer tailored solutions for problems such as metal contamination, product feeding and incorrect material screening. Our free no-obligation, on-site appraisal will help

#### SIZE REDUCTION EQUIPMENT

Rathi Industrial Equipment Co. Ltd., known as RIECO is a part of the Pune based Rathi Group of Industries. This Multiproduct group is pioneer in the fields of pigments, pesticides, and engineering products for powder technology. Rathi Group of Industries has maintained its leading position for several decades.

RIECO, an Engineering Organisation employs 300 qualified & skilled staff with a sales turnover of Rs. 200 million. The Head Office is at Pune. The works is located at Roha, district Raigad, Maharashtra and is equipped with modern machinery.

RIECO has following technical collaborators for various equipments : Klockner Becorit Industrietechnik, Germany for Pneumatic conveying Systems; Clean Gas System, Inc. U.S.A. for high Efficiency Scrubbers and Cyclones; Apparatebau Rothemuhle, Germany, for Multicell Dust Collector; Intensivfilter GmbH & Co. KG, Germany for Air Pollution Control Equipments required for high temperature applications; S+S Metal suchgerate and Recycling technik GmbH., Germany for Metal detector/separator

**Size Reduction Equipment** consists of Crusher, Bantam Hammer Mill, Hammer Mill "Mikro-Pulveriser", Universal Mill, Air Classifying Mill, Product Collection Systems to be used with above Machines.

**Air Pollution Control Equipment** includes High Efficiency Cyclones, Multiclones Dust Collectors (Bag Filters), Scrubbers-Ventury, Multivane, Gas Cleaning Systems, Tubular Cooler.

**Pneumatic Conveying Systems** include - Lean Phase & Dense Phase and Pressure & Vacuum Type



you to identify your Company's specific needs and where necessary, we will propose an appropriate solution. Eriez manufactures magnetic separators, metal detectors, vibratory screeners and therefore, we can provide a total metal removal, product feeding and screening package

Eriez Magnetics has now entered into technical collaboration with McNally Bangalore Industries Limited - a well-reputed and established company in India. This agreement facilitates local manufacture of ERIEZ Magnets, thus removing bottlenecks in sourcing them.

For more details, write to :

**McNally Bangalore Industries Limited**  
White Field PO,  
Bangalore - 560 066  
Tel. : 845 2596 (4 Lines)  
Fax : 080-8452764.

Single Loop and Two Loop applications. These Leader Line Controllers are easy to configure and operate and their compact design minimizes panel space requirements. When your control strategies change, you can easily modify the controller configuration to meet your new needs.

The board selection helps you save money because you purchase only the capabilities you need for your application. The Universal Digital Controllers include :- ● UDC 1000/UDC 1500 Micro-Pro ● UDC 2000 Mini-Pro ● UDC 3000 Versa-Pro ● UDC 5000 Ultra-Pro ● UDC 6000 Process Controller

For further details, write to:

**Tata Honeywell**  
55 - A/8, 9 Hadapsar Indus. Estate,  
Pune 411013  
Tel : 670445,675532  
Tlx : 0415 - 7324 THL -IN  
Fax : 212 675 992 /672205

## BEVERAGES

From Hajoori & Sons comes a delightful range of beverages to suit every palate.



This an exciting soft pop, a great taste sensation in a class of its own. A distinctive thirst quencher than refuses to be clubbed with the crowd.

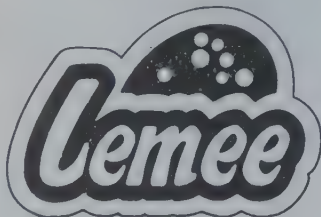


The alternative soft drink that digests, refreshes and tastes good too.



A tangy lemon-n-lime flavoured thirst quencher with Vitamin-C

GOODNESS OF VITAMIN 'C'



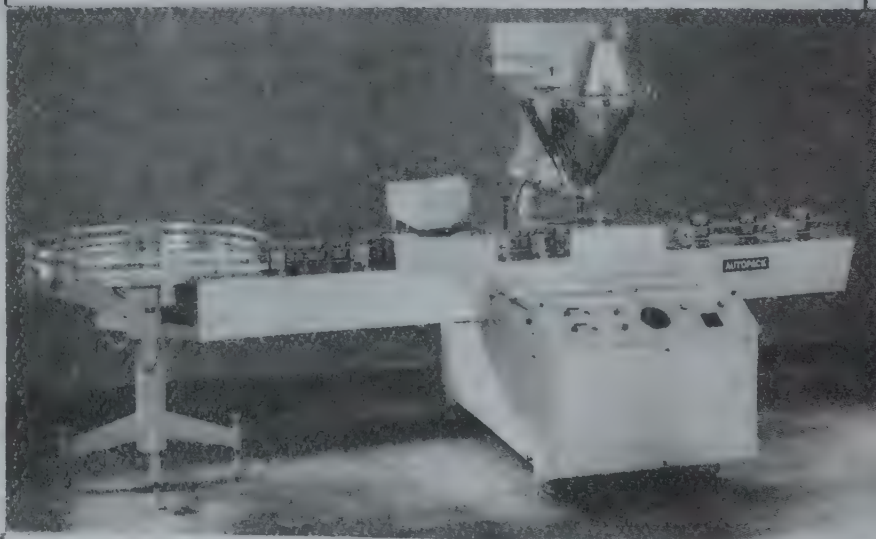
A crystal clear drink with a special fizz and lingering-refreshing taste.

For your requirements, contact :

**Hajoori & Sons**  
Udhna - Magdalla Road  
Surat 395 002  
Tel: 632141-42-43, 23701  
Fax: 91-0261-632110

## POWDER FILLING MACHINE

Autopack manufactures automatic single head Powder Filling; Machine for accurate filling of powder and granules in container/bottles etc. with an accuracy upto  $\pm 1\%$ . Filling capacity ranges from 5 gms to 1 kg. Output 30/40 fills per minute. The machine is provided with an unscrambler which streamlines for easy and trouble-free feeding of the bottles/containers. The machine is most suitable for filling Coffee and other dry food, dry syrups, chemicals, toothpowder, talcum powder, pharmaceuticals, chemicals or cosmetics etc. in powder form.



For further information, please write to:

**Autopack Machines Pvt.Ltd.**  
101-C Poonam Chambers  
Dr. Annie Besant Road, Worli,  
Bombay 400018  
Tel: 4924806/4925900/4964926  
Fax: (022)4964926  
Tlx: 11-73798.

## LOOP CONTROLLERS

Honeywell's Leader Line Controller family consists of Six Universal Digital Controller (UDC) Models. They offer incremental levels of functionality and cost and are available for

## FOOD CONTAINERS

Committed to the Packaging industry and manufacturers of tin cans for over the last three decades, Petrox Private Limited offer internationally accepted and approved O T S Containers



for packing edible food products. The containers come in different shapes and sizes. For your requirements of Aluminium extruded collapsibles, BOPP & Polyester Metallized Films, OTS containers, Oval cans, Lube Oil & Pesticides cans, etc write to us.

*For more details, contact:*

**Petrox Private Limited**

Near Indian Oil Installations,  
Wadala (E).

Bombay 400037

Tel (022)4122667, 4122696, 4132704, 4148374

Fax: (022) 414 7544

## REFRIGERATION

Refrigeration plays a very important role in the food and beverage industry during various stages of processing, storage and transportation.

Lowering of temperatures through refrigeration is necessary in breweries, wineries and carbonated beverage plants for the various processes like fermentation, wort cooling, carbon dioxide retention, vinegar production, chill proofing and storage.

Chilling and pasteurisation of milk and icecream and preparation of by-products like cream, butter, etc. are accomplished by lowering of temperature employing ICE BANK TANK SYSTEM and plate type heat exchangers.

Storage of all food products like fruits, vegetables, meat, fish, milk, ice cream, etc. are done through Air Cooling Units in complete air tight storage space with varying humidity conditions depending on the product requirements.

Kooling System has acquired the capabilities over the decades to give you assured performance. You can confidently leave the job to Kooling System for Best Value For Money.

*For your requirements, contact:*

**Kooling System**

35 Mannar Reddy Street,

T.Nagar

Madras 600017

## DRIERS AND COOLERS

McNally Bangalore Industries are the authorised representatives for Aeroglide Corporation, USA for their range of process driers, coolers and pasteurisers. Aeroglide products serve customers globally in the food processing, chemicals, rubber, wood, minerals, beverage, agriculture, tobacco and textile industries and Aeroglide are today acknowledged leaders in their field.

Aeroglide offers a full range of products and solutions to the customer's process requirements. These include single and multiple pass conveyor drier for fragile products, rotary driers and coolers for more durable products which have high initial moisture content; tower driers and coolers for free flowing materials and grains; spin coolers and heaters, pasteurisers and spray coolers for the processed food and beverage industry. This broad product mix combined with the efforts of Aeroglide experienced applications engineering group allows them to select the most efficient, cost effective solution to customer's process requirements.

Besides, Aeroglide products, McNally also offer clarifiers, magnetic equipment and metal detectors for the food processing industry.

*For more details, contact:*

**McNally Bangalore Industries Ltd.**

Whitefield P O,

Bangalore 560066.

Tel: 845 25 96 (4 lines)

Fax: 080-845 2764

## GIC SILO SYSTEMS

Shirke Siporex is a professional organisation with an annual turnover of Rs.3,000 million. Established over 50 years ago, the group has a proven track record, technology, large resources, and diversified activities in various fields including execution of turnkey projects in civil, structural, electromechanical, agro engineering, environmental and energy cogeneration.

Agro Division of Shirke Group manufactures complete GIC Silo storage complete with grain handling equipments, grain cleaners, batch dryers on turnkey basis. Silos manufactured by Shirke is designwise very strong and galvanising is done after all manufacturing processes to make it totally rust proof. More than 100 GIC silos are already installed all over India and abroad ranging in capacity 5 MT to 6000 MT each including 35 silos of capacity above 2500 MT.

*For further details, contact:*

**S.Shirke**

72-76 Mundhwa, Pune 411 036.

Cable : BUILDALL, Tlx : 0145-7280 BGSP IN

Tel : 670151-52, 670232, 670861

Fax : (0212) 671612.

## PLATE EVAPORATORS

A range of Plate Evaporators for concentration of wide spectrum of products primarily for heat sensitive materials have been introduced by Praj Industries in collaboration with APV Anhydro Separation Technologies, USA.

With over 2000 installations world-wide, these Plate Evaporators offer significant advantages over conventional evaporators like lower residence time, low liquid hold-up, greater accessibility, easy maintenance, flexibility in capacity, greater product concentration (upto 97%) and lower installation cost.

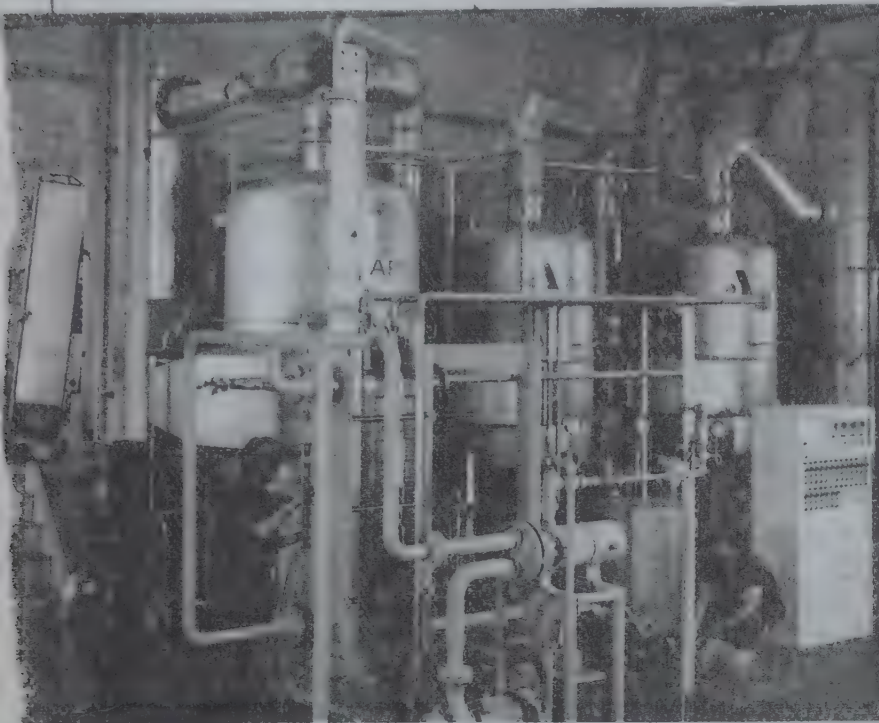
Lower residence time, one of the critical factors in the food and beverage and dairy industries, results in the product being exposed to high temperature for a very short time, thus offering improved concentrate quality without deteriorating the product.

The Plate Evaporator range from Praj includes Ecovap - Rising/Falling Film Plate Evaporators, Falling Film Plate Evaporators, Ecovap PV and Ecovap PF for application in fruit juice concentrate, milk, gelatin, food and beverage.

The Ecovap PF designed to operate as a forced circulation, suppressed boiling evaporator is ideal for products than crystallize during concentration or those with a high percentage of suspended solids like distillery effluent, grape juice, brewers yeast (suspended solids), chemical wastes, etc.



The Ecovap PV has been specially designed for duties involving high solid concentrates or high viscosity, like fruit juices, sugar solutions, soaps, etc.



*For your requirements, contact:*

**Praj Industries**

1216/6 Fergusson College Road  
Pune 411004.

Tel: +91-212-321 301/2/3, 322 608

TLX: 145-7279 PRAJ IN

Fax: +91-212-321 689

### SEPARATION MACHINERY

Forsberg Agritech (India) Pvt.Ltd. has entered into technical collaboration with Forsberg Inc. USA for the manufacture of the world famous Forsberg range of separation machinery. The machines being manufactured are Screen Cleaners, Screen graders, Dry Destoners, Specific Gravity Separators, Impact Huller and Air Separators. These machines are custom built for the Spices, Oilseeds, Grains and Cereals, Pulses and Grams and Hybrid seeds processing industries.

Forsberg Agritech is the sole and exclusive collaborator of Forsberg Inc. U.S.A. in India.



**Gravity Separator**

*For more details, write to:*

**Forsberg Agritech (India) Pvt. Ltd.**

123 G.I.D.C. Industrial Estate

Makarpura

Baroda 390010

Tel: 445 752/340 597

Fax: 338 150

### CORRUGATED BOXES/CARTONS

Natraj Paper Box Factory are manufacturers of corrugated boxes. The company's boxes are widely used in leading Industries like Food Products, Pharmaceuticals, Glassware, Plasticware, Electrical and many more industrial items.

*For more information, please contact:*

**Natraj Paper Box Factory**

E-117 Ansa Industrial Estate,

Saki Vihar Road,

Sakinaka,

Bombay 400072.

Tel: 578 6785, 5786690

### FOOD PROCESSING MACHINERY/PLANTS

Vamp Engineers Pvt. Ltd. are Designers and Manufacturers of Plant and Machinery for Food Processing, Dairy, Pharmaceutical and allied industries.

The company offers product range such as Planetary Mixers, Drum Mixers, Ribbon Mixers, Granulators, Dust free Granulation using IPC system, Fabricated Vessel, Special Purpose Machines, etc.

*For further details, contact:*

**Vamp Engineers Pvt. Ltd.**

203 Rajguru Apts.

New Nagardas Road, Andheri (E),

Bombay 400069.

Tel: 91-22-8390195

### CHEMICAL PLANT & EQUIPMENT

Adam Fabriwerk Pvt. Ltd. are designers, manufacturers and erectors of Plant and Equipment for Chemicals, Pharmaceuticals, Fertilizers and Drug intermediates.

The company offers product range comprising Ointment and cream plant, fluid bed driers, reaction kettles, storage tanks, silos, heat exchangers, crystallizers, blenders in ribbon, paddle, cone and cylindrical shape, agitators, and standard stirrers, custom built fermentors and extractors, etc.

All fabricated equipment are tailormade under various codes such as IS, BS, ASME, DIN STANDARD.

*For further details, contact:*

**Adam Fabriwerk Pvt. Ltd.**

203 Rajguru Apts.,

New Nagardas Road,

Andheri (E).

Bombay 400069

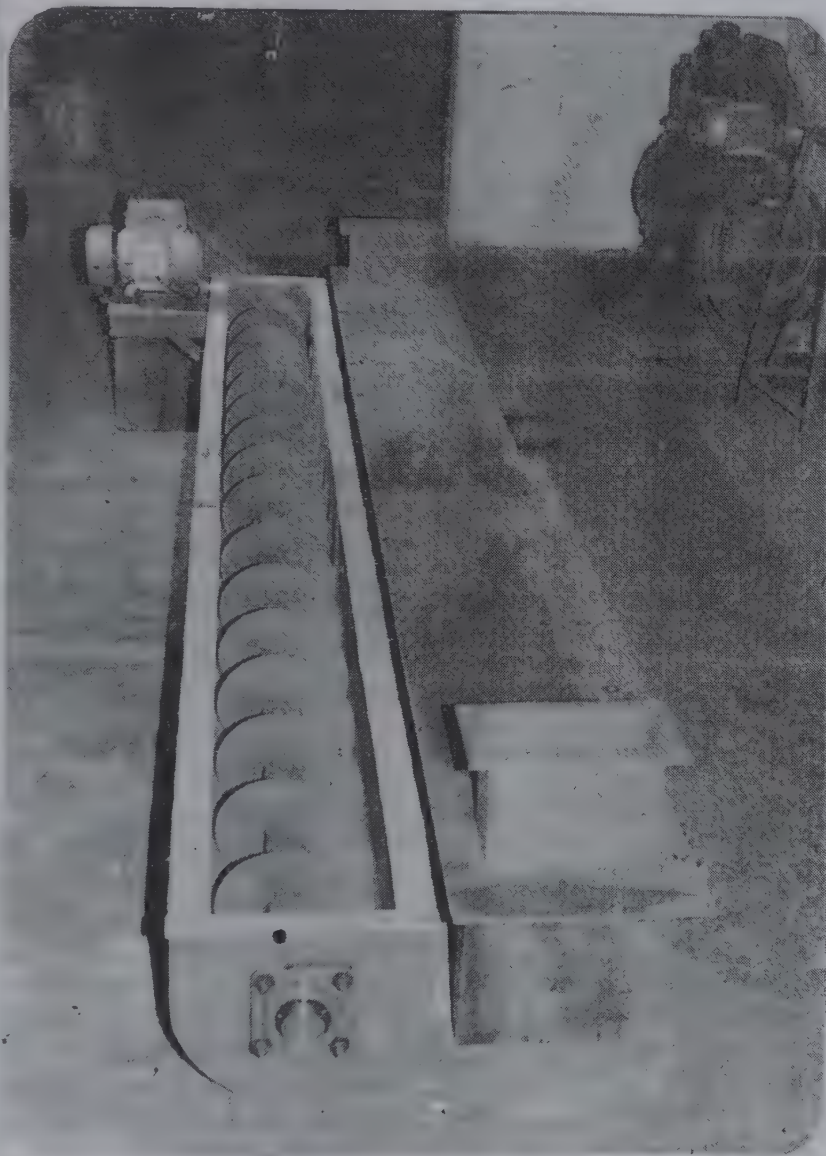
Tel: 8380548, 8384173

Fax: 91-22-8390195



## CONSULTANCY & DESIGN

DUCON is one of the leading consultants, designers, suppliers, manufacturers, and exporters of Mechanical and Pneumatic Material Handling Equipment/Systems, Pollution Control System such as Pluse Jet Filters, Bag filters, Flow control valves such as rotary valves, line divertors & slide gates, volumetric screw feeders, dosing units, conveyor accessories. For the last twenty years we have been supplying our equipment to a wide range of clients in nearly every field in the food and beverages industries. Superior designing, quality manufacturing, stringent inspection plans backed by a nation wide sales and after sales support ensures that our customers receive years of service, our equipment/ system are available in a number of sizes and various material of construction depending on your application.



For further details contact :

**Ducon Equipments Private Limited,**  
6, Alpana, 2nd floor,  
Peddar Road, Bombay - 400 026.  
Tel : 388-8294/ 532-2394/ 579-0271.  
Fax : 00 91 22 578 7929.

## TIN CONTAINERS

Kaira Can Co.Ltd. is a leading manufacturer of tin containers for packing Dairy products such as Cheese, Butter, Milk

Powder, Baby Food, Processed foods, vegetables, fruits, juices, mushrooms and several food items. The company also manufactures General Purpose Cans for packing products like oils, pesticides, pharmaceuticals, paints etc. The Company also export OTS cans for packing fruits, vegetables, tomato paste etc. besides components required for tin containers.

The Company is equipped with sophisticated automatic body making lines producing large volumes of cans of international standards. The Company has four plants located in Gujarat at Anand, Mehsana, Kanjari and Himatnagar, having its Registered Office at Bombay.

The Company also packs and markets "Amul" milk in Bombay since 1992.

The Company proposes to expand its present can manufacturing activities and diversify into other packaging products.

For your requirements, contact:

**Kaira Can Company Ltd.**

Tiecicon House, Dr. E. Moses Road,  
Bombay 400011.

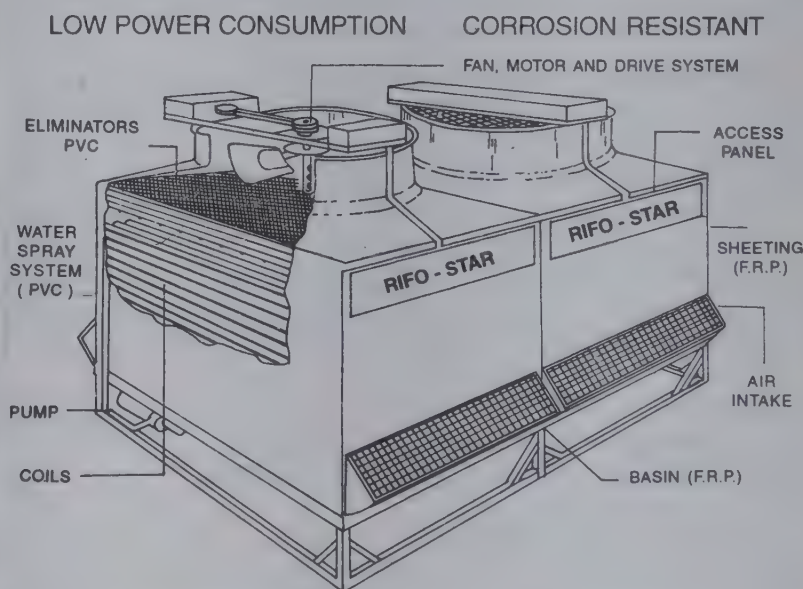
Tel: 496 43 75 (5 lines)

Tlx: 011-73730 CANS IN

Fax: 495 04 82

## EVAPORATIVE CONDENSER

Heat may be rejected from a condensing refrigerant to the atmosphere by 1) An evaporative condenser. 2) A combination of water cooled condenser and cooling tower. 3) An air cooled condenser.



Evaporative condensers with North Star USA technology is a combination of water cooled condenser and air cooled condenser. The evaporative condenser reject heat from a condenser vapor into the environment.

Evaporative condensers are widely used for condensing vapor in mechanical refrigeration. Industrial process, air conditioning system & Ammonia Absorption Refrigeration etc.

Rifo Star manufactures models of various capacities. These are overhead fan mounted with their inherent advantages.

The evaporative condenser works on the principle of simul-



taneous heat & mass transfer. In this condenser the refrigerant which is to be condensed, flows in a coil over which water is sprayed from a special non clog PVC water nozzle and at the same time air is sucked in across the coil with the help of induced draft of the fan. The water film on the outside of the coil evaporators on the air draft and the latent heat required for this evaporation of water is supplied by the condensing refrigerant vapours flowing in the inside of the tubes. Thus constant temperature condensation of the vapour is achieved.

Evaporative condensers reduce the water pumping and chemical treatment requirements associated with cooling tower / refrigerant condenser system. In addition, they require substantially less fan horse power than the air cooled condenser of comparable capacity. The evaporative condenser can operate at a lower condensing temperature than an air cooled condenser. When SS tubes are used, no water treatment is necessary and external scale can be removed by diluted HNO<sub>3</sub> circulation. Compared to shell & tube condenser & cooling tower about 15% electrical consumption can be saved due to low pressure condensation of refrigerant. There is no down time required for annual cleaning.

Rifo Star also provides Ethylene Glycol closed circuit cooling system for Ammonia compressor cylinder jackets. Together both systems give you most reliable ice manufacturing utility.

*For your requirement, contact*

**North Star Equipment Co. (I) Pvt. Ltd.**

5, Krishna Kunj,

64/31, Erandwana,

Pune - 411 004

Tel. : 340793, 348213

Fax : 0212-348241

### TURNKEY PROJECTS

Orbit International Technologies Pvt. Ltd. is involved in executing Turnkey projects in Food Processing Industry. This includes storage of Fresh Vegetables and Fruits in Tolsma, Holland's Controlled Atmospheric Storage Systems, Potato Processing, Vegetables and Fruits IQF system dehydration of Vegetables from Kiremko, Holland and Poultry Processing Lines from Meyn, Holland. The company also supplies Green Houses and necessary accessories from Rovero, Holland for Floriculture Industry.

*For your requirements, contact :*

**Orbit International Technologies Pvt. Ltd.**

404, "Taramandal Complex," Secretariat Road,

Hyderabad - 500 004

Tel. : (040) 241216, 597798

Fax : (040) 599068

### PECTINS

Citrus Colloids Ltd. (CCL) of Hereford, England, UK - (CCL) is now the world-wide name for excellent quality Pectins. CCL (formerly known as Bulmer Pectin) is a specialist company solely dedicated to the production and distribution of Pectin. They have been producing pectin since 1937 and today, with modern manufacturing plants in the UK and Brazil, they are one of the largest producers of pectin in the world. CCL were the first pectin producer to achieve ISO 9000 Quality Standard. Twice in recent years CCL have received coveted Queen's Award for

### Export Achievement.

CCL's dedicated technical experts provide customers around the world with technical support, including seminars, problem solving and new product development. CCL's pectins are very versatile and their tailor made different types of pectin are produced to meet specific customer requirement. CCL in fact offers more than 30 different pectins and each type has dozens of different applications.

CCL are also continuously innovating their production technology ; some time back they installed a new 'State-of-the Art' evaporator costing one and half million sterling Pounds. This sophisticated equipment runs faster than a jet engine, reuses its own energy, so reducing running costs. It also enables CCL to produce a greater quantity of best quality pectin

*For further details, contact :*

**Saisha Industrial Corporation**

Saisha House,

386, HAL Second Stage,

Bangalore - 560 008.

Tel : (080) 5280255

Fax : (080) 5282384

Grams : JUNIPER

### AUTOMATIC PACKING MACHINES

The GVB range of machines from A.M.P. Rose (P) Ltd. are available to customer order with the option of two types of control systems - micro processors or P.L.C. The system controls all machine functions i.e., bag speed, bag length, print registration, overprinter, product call, no product no bag, vertical and horizontal seal temperatures and dwell times (dual heating system available).

The system can automatically monitor jaw obstruction, film breakage, print registration misses, overprinter tape run-out, packaging material run-out, guard circuit faults. The system can be designed to hold up to 99 product codes. The horizontal and vertical seal system run on hardened shafts and linear ball bushes for a long, trouble - free life.

The machine are available in single or twin versions, making maximum use of production area and output speeds of modern multi-head weighing systems, like the A.M.P. Rose 'Vortex' and 'Mini-Vortex' machines.

Packing speeds of 200 packs per minute (Twin machine) can be achieved dependent on pack size, product to be packed and packing material. The machines can be linked to a wide variety of multi-head or liner weighers, fillers, augers, bucket elevators, multi rack counters, bowl feeders, some liquid fillers and robotic feeds. The machines are suitable for the packaging of fresh or frozen foods, confectionery, powders, liquids and hardware products.

*For more details, contact :*

**A.M.P. Rose (P) Ltd.**

38, Double Road, K.H.Road,

Bangalore - 560 027.

Tel : +91- (0) 80-2226227/ 2216514

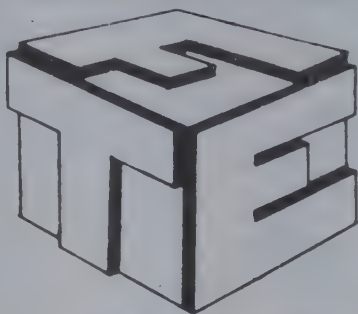
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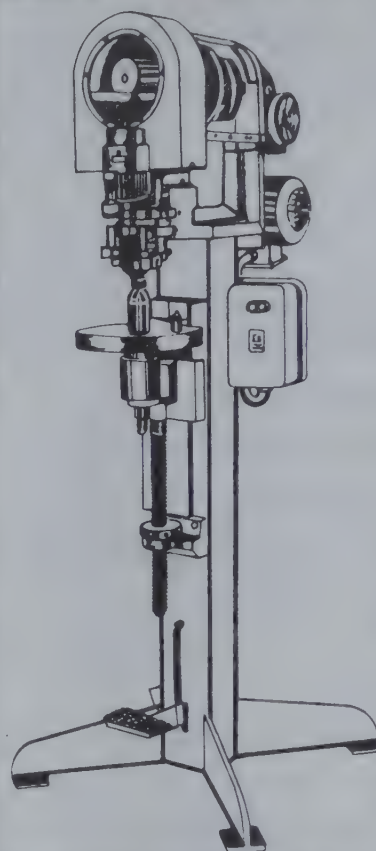
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Satyam (Ansal) Building, Raj Nagar, Distt. Centre  
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JAIPUR - 139, Vijay Path, Tilak Nagar,  
Behind Birla Mandir,  
Phones : 622283 P.P.



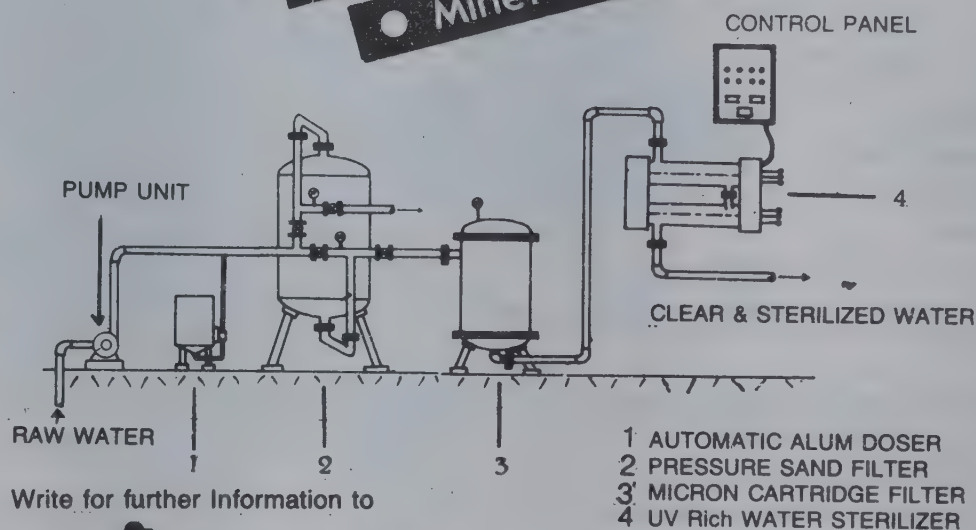
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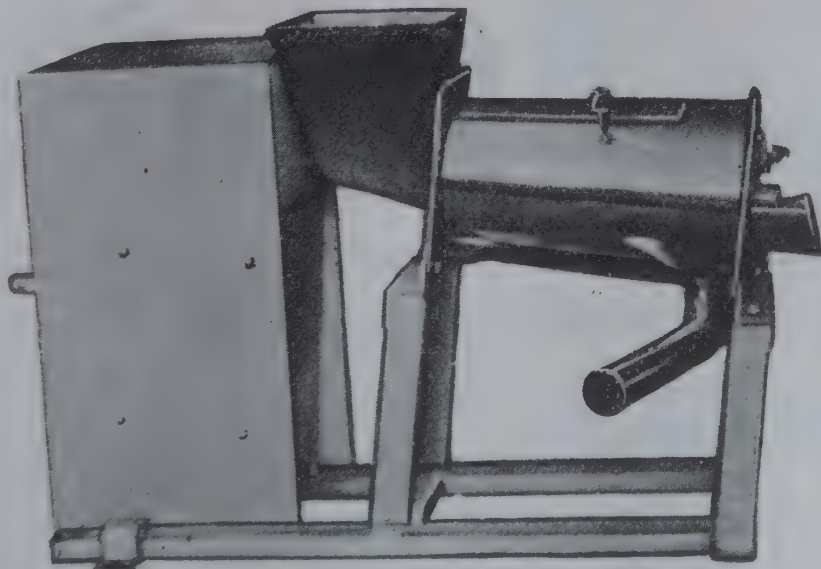
F-4, Shri Kumar Hsg. Society, Nehru Road, Santacruz (E), Bombay-400 055. India  
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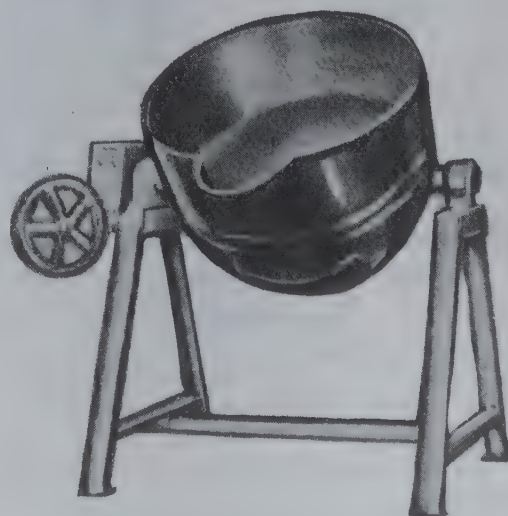
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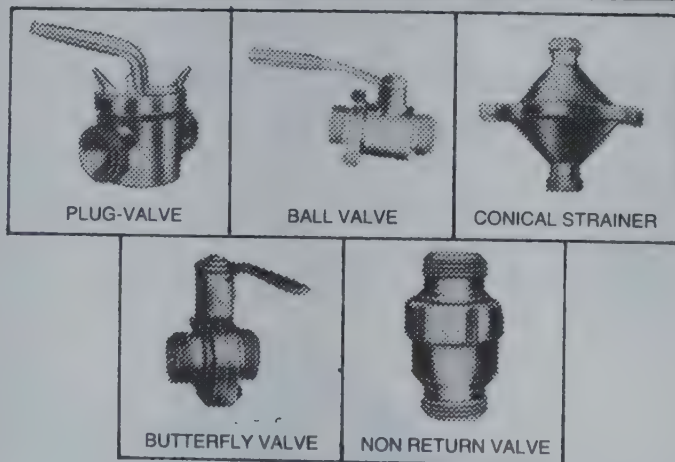


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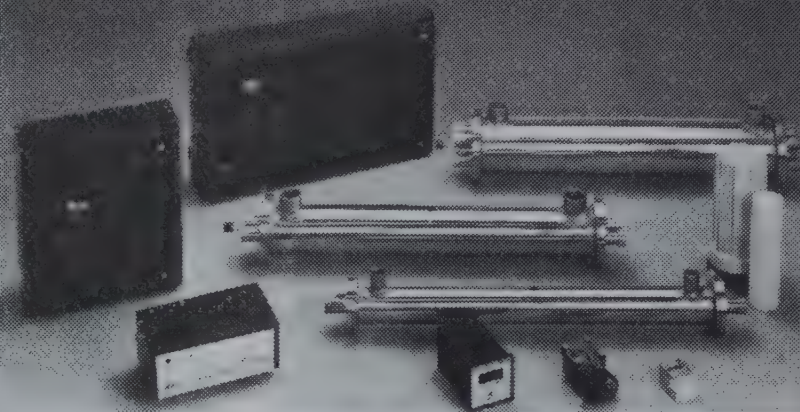
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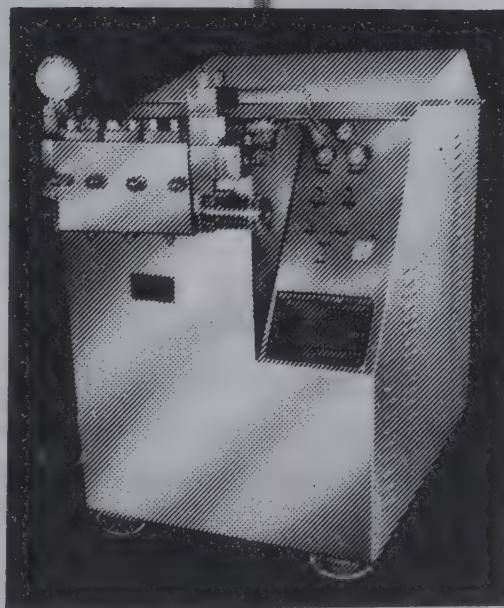


**Goma** Engineering established a decade ago, initially developed 100% indigenous **High Pressure Homogeniser** and successfully launched **Truly, a World Class technology product.**

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*For more details, please contact,*



*General Manager (Domestic Fairs Division) :*

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"O-Buster" finds application in Baked Food packets such as Cakes, Cookies, Pies, Donuts; Staples such as Rice, Grain, Noodles, Seeds, Beans, Nuts, Dried Fruit & Vegetables, Dried Meat, Sausages, Ingredients such as herbs, spices, coffee beans, tea, chillies, bulk foods like wheat bran, health foods.

*For further details, contact :*

**The Panchal Workshop**

P.B. No. 62, Anand Sojitra Road,  
Anand 380 001, Gujarat.

Tel : (02692) 34332, 34399, Fax : (02692) 46454, 34332

Tlx : 0172-251 VUIA PAN.

**FOOD PRODUCTS**

Pioneer in making of syrup crush, sherbat from Kesar, Badam, Dry Black Currant, Apricot, Dry Fig, Mix Dry Fruit, Plum-Peach, Chocolate, Kokum, Thandai from Natural & Pure Material.

Dr. Vidyutt K. Naram is B.Sc. with Chemistry and has done Craft Diploma in Bakery & Canning from Dadar Catering Collage in 1982 and done Doctorate in Nature Cure from Delhi. The Nature Cure Federation of India which was started by Mahatma Gandhi.

Vidyutt's wife Neela Naram is B.Sc. DMLT & Cookery expert, and looks after production. Syrup, Crush, Sauces & Chutney are manufactured by using Quality Ingredients. Process Parameters are carefully controlled and have desired characteristics, quality, suitability, acceptability by people. She has developed authentic Pani Puri Concentrate, Hot & Sweet Chutney, Amla Spread, Picante (Pizza) Sauce, Ginger Spread, Dry Fruit (Veg.) Cake & Dessert Sauces etc. Their product of Special Variety are exported to different countries.

*For further details, contact :*

**Naram's Food Products**

Post box No. 7694,

Bombay 400 067.

Tel : 8873328/8019796, Fax : 806 1317.

**ROPP BOTTLE CAP SEALING MACHINE**

This machine is specially designed for export market hence all the parts are manufactured as per standard specification and all the dimensions are mechanical for interchangeability. Provisions are made to adjust any size of cap ranging from 18mm to 54mm with replaceable pressure pad. It has also additional attachment for tightening of lug caps of different sizes with appropriate pressure and touch. The machine is fitted with separate motor to drive the gear-box as to make easy replacement of any motor available. The machine can seal metal cap from 30 to 45 per minute on any glass or plastic bottles.

*For further information contact :*

**Identical Parts**

242, Madhani Estate, S.B. Marg, Dadar,  
Bombay 400 028

Tel : 4223019

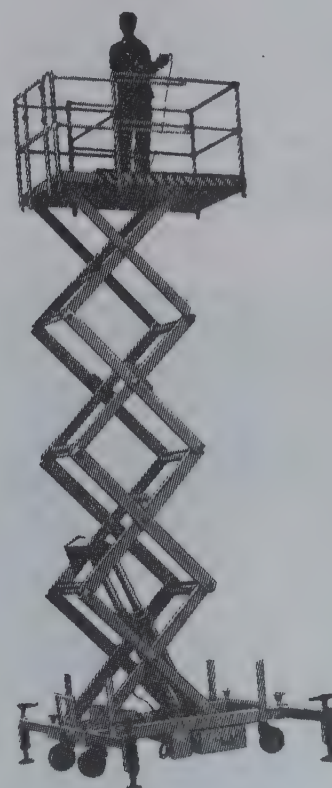
**HYDRAULIC ELEVATING  
MOBILE WORK PLATFORM**

'Tiger' Hydraulic Elevating Mobile Work Platform operates at the touch of a button to lift men and material to working height quickly and safely. It can be smoothly taken up or down and stopped at any intermediate position by operating the Push Button switch. This versatile equipment can save time, money and manpower on overhead maintenance jobs like repairs, painting, welding, installation of electrical equipments, pipe lines, air ducting in warehouses to shift the material from ground floor to first floor. It will virtually eliminate the need for fixed scaffolding and will fit in tight places where bulky conventional lifts can not be used.

Operating safety is a prime consideration in the design and manufacture of the 'Tiger Lift'. All hydraulic components are fail safe designed so that neither electrical nor hydraulic system failure can cause the platform to freefall.

The extended-deck platform is available option, that gives the user safe access to areas above overhead obstruction. With the extended-deck retracted, it can be positioned next to the construction elevated untill the platform is above it and the extended deck slide out to provide access.

Standard power requirement for Mobile Lifts is 400 volts, 3 Phase, 50 Cy, A.C. or can be supplied with 24 volts D.C. Battery operated self contained unit optional.



*For further details, contact :*

**Ferro Foundries Private Ltd.**

Yelwal Road, Belvadi

Mysore - 571 186

Tel : 42376, 42633

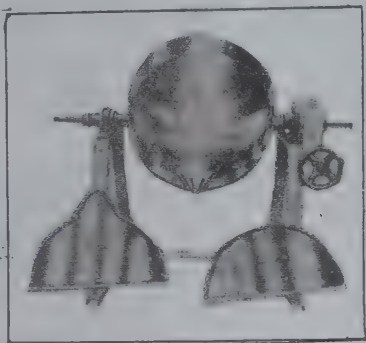
Tlx : 0846-224 HPW IN

Fax : NATIONAL : 0821-42052, INT. NAL : 0091-821-42052



## STEAM JACKETED VESSELS

Elma Industries offers jacketed vessels made of 304 quality 2 mm thick stainless steel plates. All the joints are welded by argon arc process, ground smooth, and polished. The vessels are designed for steam pressures up to 20 PSIG and steam consumption from 10 to 15kg/hour. The outer jacket is provided with steam inlet and outlet and a 1/2" draincock at the bottom to drain out condensed water. The steam inlet is provided with a 4" dial pressure gauge and a spring loaded valve. The vessel is suspended on gland packed trunnions. It comes complete with bush bearing and fitted with worm and gear with drive steering system for tilting, and the cover in two parts. These vessels are available in capacities from 25 to 500 litres and above.



For more details, contact :

**Elma Industries**  
A-15, Aaram Society,  
Vakola, Santacruz (E)  
Bombay - 400 055.  
Tel : 612 93 15

## FOOD PROCESSING/PACKAGING



L&T undertakes design, supply, installation and commissioning of plants and equipment for large automated dairies, breweries, wineries, edible oil, margarine, soya milk processing, fruit and vegetables processing, meat, poultry, fish meal, ice cream, paste foods, baker's yeast, protein isolate and other food products.

Bottling plants for milk, soft drinks, beer, including kegfilling machines, road and rail milk tankers, separators and clarifiers, homogenisers, butter packing machines, aseptic packing machines, juices extractors, icecream freezers, evaporators, breweries, oil refining plants, accelerated freeze dryers, ultra filtration equipment, low velocity and dense phase pneumatic conveying systems.



L&T manufactures quality Bottle Closures- crown caps, roll-on-pilfer-proof caps (ROPP), twist-off-caps, beverage caps and Alu tear - off - caps - at its modern packaging plant at Powai.

Crowns used for soft drinks, beer and food products incorporate the latest international Zapata DB liner concept.

ROPP caps used in the pharmaceutical and distillery sectors are lined with EPE (Expanded Polyethylene) gaskets to ensure hygienic, leak-proof sealing.

VasuSeals are twist-off caps used by the packaged food industry. They are superior to conventional closures in performance and sales appeal.

Fresh Tops are gas-tight and air-tight seals which preserve freshness and increase shelf-life of carbonated beverages.

Alu tear-off caps are an ideal alternative for sealing beverages and liquors.

For further details, contact :

**Larsen & Toubro Limited**  
L&T House, Ballard Estate,  
P.O.Box 278,  
Bombay 400 001  
Tel : 2618181, 2618182  
Fax : 91-22-262 0223, Tlx : 11-80020  
Grams : 'LARSEN BRO'

## KITCHEN FOIL

'Kitchen Foil' made from pure aluminium, offers you all these remarkable benefits : perfect protective material, non-toxic, odourless and having no taste of its own. Made from pure

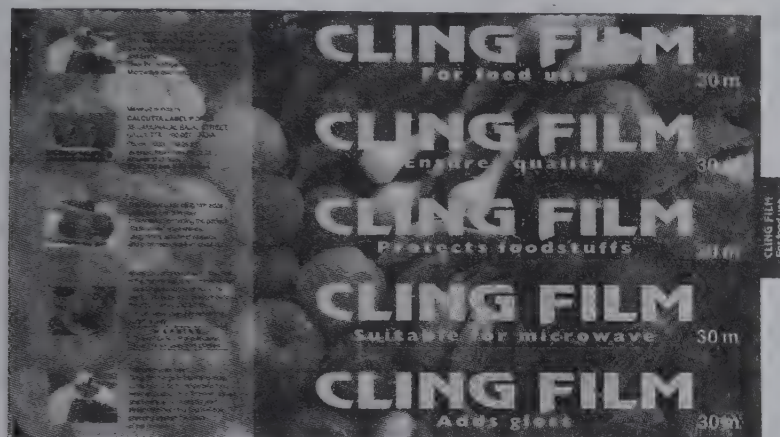


aluminium, 'Kitchen Foil' cools and heats rapidly. It is light and flexible yet firm enough. You can fold it into any shape you wish.

'Kitchen Foil' comes in convenient rolls measuring 9 mts in length and 300 millimetres in width. With the easy tear device, you can easily cut only as much 'Kitchen foil' as you need.

Cooking .... Wrapping .... packing .... decorating .... there are many, many ways in which you can put wonderful 'Kitchen Foil' to work.

Also offered is Cling Film which provides an excellent seal. Cling Film adds gloss and lustre to your food presentation providing the perfect "Fresh Today" appearance that's so important to consumer appeal.



It is ideal for Restaurants, Cafeterias, Caterers, Airlines, Schools, Self Service Outlets, Coffee shops, Company Canteens, Hospitals, Food stores etc.

A quick economical and hygienic process for food wrapping and protection, Cling Film keeps the flavours, freshness and taste inside and prevents mixing of flavour transfer from one food to another. Very convenient for use in Freezers, Refrigerators, Microwave oven.

For further requirement, contact :

**Foil Impex (Bombay) Pvt. Ltd.**

66, Bharat Mahal,

86, Marine Drive,

Bombay - 400 002

Tel : 91-22-2017202 / 2011401 / 4939756

Fax : 91-22-4950467

electrohydrodynamic film of lubricant between contact surface effecting smooth transmission of power.

Speed variation can be obtained from - Maximum speed =  $1.7 \times$  Input speed & Minimum speed =  $1/7 \times$  input speed. This has provided versatility to machine by enabling it to be adjusted to the speed in changing job conditions : Operators size & shapes, Material production schedules. The benefits are maximum production, Reduction in manufacturing cost.

Application : Agitators/Stirrers, Conveyors, Wire drawing machine, Extruders, Printing & Packing Machines, Textiles machine, Bottling plants, Rotary pumps, soap industries etc.

For more details write to :

**Union Enterprises**

113, Nagindas Master Road,

Fort,

Bombay 400 023

Tel : 267 13 68/ 267 65 60 / 267 53 16

Fax : 2674071, Gram : UNIPUMP

## ESSENTIAL OILS/FLAVOURS

Harish C. Khosla & Co. is a leading well known organisation in the field of distribution of Flavours, Essential Oils, Fragrance & Saccharin (Bicycle Brand) since 1948. They are Commission Agents ( C & F Agents) of M/s. Quest International India (formerly Naarden (I) Ltd.) who are manufacturers of Flavours (both liquid & powder), Pastes & Emulsions, Essential Oils, Fragrances and Food Ingredients.

These products are widely used in the field of Biscuits, Confectionery, Cold Drinks, Distilleries, Processed Food, Pharmaceuticals, Tooth Paste, Soaps, Shampoos, Cosmetics, Hair Oils, Agarbaties, Sprays, Tobacco etc.

For further requirements, contact :

**Harish C. Khosla & Co.**

Zinat Mahal, Lal Kuan Bazar,

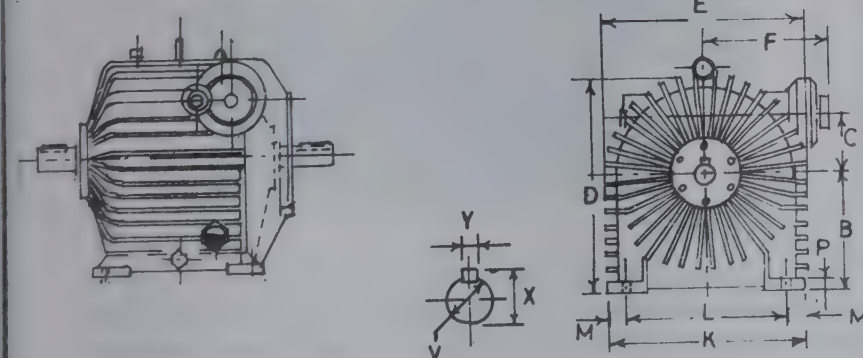
Delhi - 110006.

Tel : 733160 - 7524803

Tlx : 031-62267-HCK IN

Fax : 91-011-7524403

## MECHANICAL VARIABLE SPEED DRIVES



'Multispeed' presenting the mechanical variable speed drives is designed to totally enclose, oil lubricated, stepless position variable speed drive unit. It works on principle of friction drive, through double conical roller having metal to metal contact with driving and driven element through an extremely thin

## PACKAGING MACHINES

We have been in the field of packing machines for the last decade. With intensive R & D as well as extensive field trials and active interaction with users on the problems faced by them, we have been manufacturing machines to pack a variety of products from grains, cereals, pulses etc. to powders, to liquids (free flowing as well as viscous).

Our main aim has been to cater to the needs of clients who find automatic machines beyond their budget, but whose volume of business is too much to handle with the use of manual packing methods. We also manufacture special purpose machines to suit the exact requirement of the client.

For further requirement, contact :

**Selall**

Geetanjali,

9, Deccan College Road,

Yerawada, Pune - 411 006

Tel : 66 83 69



## FILTER HOUSINGS / CARTRIDGES

In years past, the pureness of our water was taken for granted. We no longer have that privilege.

The most obvious need is for removal of suspended solids from water. Filtration is the process of passing water through a porous, fibrous medium such as paper, cloth or synthetic membrane to remove the suspended particles.

Ametek, Inc is a Fortune 500 global manufacturing company with its headquarters in USA. The company makes high quality, technology based products. Plymouth Product division, a part of Ametek's Industrial materials group handles housings and filters for water and other fluids in such Commercial/Industrial applications as Food Preparation and Beverage Vending.

The Ametek filtration range includes PP Fibre cartridges, PP Wound cartridges, Pleated cartridges, Cellulose Resin Bonded cartridges, Carbon cartridges in lengths of 5", 10" and 20" with nominal micro rating of .2 to 50 microns. Furthermore, for cartridges used in Food, Beverages and Pharma Industry, materials which meet FDA specifications are used making it safe for such applications.

The cartridges are compatible for used with standard housings of other makes.

Ametek also offers a variety of filter housings to choose from with flow rates ranging from 2000 to 9000 LPH.

*For more details, contact :*

**Ace Marketing Company**  
222, Shah & Nahar (A2)  
Lower Parel,  
Bombay - 400 013  
Tel : 494 4942, 494 5957  
Fax : 91-22-4954250

## BRUSHES

Poona Brush Co. are manufacturers of Industrial & Special Purpose Brushes.

We specialise in manufacturing brushes for Processed Food and Beverages Industry, as per specifications & drawings, like Bottle washing Brushes, Pulper/ Destoner Brushes, Brush Rolls for Conveyors & Washing Line, Floor Cleaning & Floor Scrubbing Machine Brushes etc.

Import substitute is our speciality.

*Contact for details :*

**Poona Brush Co.**  
Shed No. 8, Parvati Industrial Estate,  
Satara Road,  
Pune - 411 009.  
Tel : 447818 / 442238  
Fax : 91-0212-447818

## SAGO / TAPIOCA STARCH

The Salem District Starch and Sago manufacturers, Service Industrial Co-operative Society Ltd., popularly known as Sagoserve is largest service Industrial Co-operative Society in India functioning under the Industries Department Government

of Tamil Nadu. Sagoserve provides a healthy marketing floor to the manufacturers of tapioca starch and sago.

Sagoserve is handling over 20 lakh bags of starch and sago annually. During the year 1994-95 Sagoserve has performed a sales turnover of Rs. 118 crores. The total turnover during 1995-96 is expected to cross 130 crores mark.

Sales is effected through a unique system of Daily Tender and the sellers and buyer get the appropriate prices and appropriate quality respectively.

Sagoserve deals in all grades of sago and starch. Maximum High Paste, High paste unpaste and Allukku are the grades in starch and superfine, Milk white, Special, Best, Pearl and broken are the grades in Sago. Alakku varieties of sago and starch are also available.

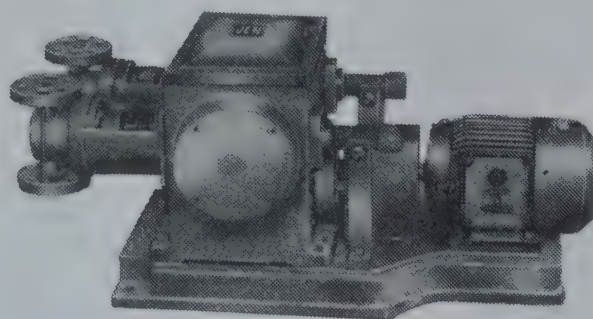
Government have offered various incentives like concessional Sales Tax @ 2% for sale of sago and starch through Sagoserve (Outside it is 4%), abolition of Central Excise Duty, Single point tax system and state participation on the Share Capital structure of the society.

*For further details, please contact :*

**Sandeep Saxena, I.A.S.,**  
Special Officers/ Managing Director,  
**Sagoserve,**  
Salem - 636 302  
Tel : 448046, 448133  
Fax : 0427-445028  
Gram : SAGOSERVE

## METERING/DOZING PUMPS

JEW pumps are reciprocating plunger type having stroke adjustment from 0 to 100% of the stroke. As it is designed on positive displacement principle, the accuracy of the pump is as fine as  $\pm 1\%$ , with repeated accuracy. Also it works up to a pressure of 50 kgs/cm<sup>2</sup>. We offer capacity from 002 ltrs/hr to 700 ltrs/hr, in CI, S.S. 304, S.S. 314, Alloy 20, PP, P.T.T.E., Hast Alloy etc. Material of Construction.



JEW Model Metering/Dosing pumps have stood the test of time by catering to the needs of wide and varied Industries in almost all fields since last 25 years, say the oldest in the field of this technology. Right from Laboratory/Research institute to giant industrial units remember our name "JEW" through out the length and breath of India and countries like Ceylon, Saudi Arabia, Egypt and Indonesia etc.

JEW pumps are inspected at every stage right from the casting to assembly and then are subjected to rigorous practical



test for capacity and pressure before they are finally passed. As a result of this JEW pumps stand first in quality. The secret of progress is the secret of quality/services. We have rendered/been rendering to our esteemed clients. JEW pumps have become popular in the market because of the compact design, Inter changeability of spares, trouble free service and good performance.

We are well renowned for our Simplex and Duplex Model Plunger Pumps which have established a permanent position in all types of industries, and they come to us whenever they are in the market i.e. for "JEW" pumps. So "How About You". We also manufacture Safety Relief Valves.

*For more details, please contact :*

**Jagdish Engineering Works**

7/2, Rocky Industrial Estate,  
I.B. Patel Road, Goregaon (E)  
Bombay - 400 063

Tel : Off : 873 11 34 Resi : 872 52 32

C/o Fax : 873 55 55

of rigid polyurethane foam results in the joints being completely with insulation. Therefore, there is a monolithic layer of rigid polyurethane foam insulation enveloping the entire cold store/ deep freezer without any gaps. This eliminates heat leakage into the cold store/deep freezer and hence results in improved erecting of the refrigeration machinery.

The cold rooms or deep freezers can have the temperature from +22° to -40° C and have wide applications for food processing and storing.

*For your requirements, contact :*

**Shree Precoated Steels Ltd.**

Perin Nariman Street,  
Hanuman Bldg, 308,  
Fort, Bombay 400 001  
Tel : 266 1232 , 266 1141  
Fax : (91) (22) 266 1878  
Tlx : 011-82793 YOGI IN  
Gram : AJMERABILD

**FLUID PROCESS APPLICATION**

Alweyn Pumps & Systems provide a world of expertise and fine-tuned technology in every conceivable area of fluid process applications. From waste water treatment water treatment, mineral water plants to membrane separation systems, concentration systems in food processing and dairy applications, specifically for concentration /demineralisation for whey, proteins, lactose, milk.

The company also manufactures Triplex Pumps for use in Reverse osmosis, Boiler feed, Die casting etc. And also metering pumps for dosing of toxic liquid, abrasive slurries, etc.

*For your requirement contact :*

**Alweyn Pumps & Systems Pvt. Ltd.**

62, Apollo Industrial Estate,  
Off Mahakali Caves Road,  
Andheri (East)

Bombay- 400 093

Tel : (022) 8327467

Tel/Fax : (022) 8362688 / 8214026

Telegram : ALWEYN FAM BOMBAY 59

**SANDWICH PANEL**

Ajmera Group of Companies is a leading organization in India with interests in construction, cement, hotel, engineering & steel industry.

Metacolour Puf-filled Sandwich Panel is another highly improvised product where rigid polyurethane foam is Sandwiched between Metacolour sheets on both sides. This product has already made entry in India for different applications, such as Fabrication of Cold Storages, Air-conditioned Rooms, Refrigerated Vans & High Altitude Porta Cabins etc. Metacolour Sandwich Panels are manufactured from 40mm to 200mm thick panels for various applications.

We wish to draw your attention to the following features of the modern method of constructing cold stores/deep freezers using precoated metal faced sandwich panels. All joints between ceiling and wall panels between wall panels and floor insulation are with excellent locking system. The interlocking application

**GRANULE/POWDER/FILLER**

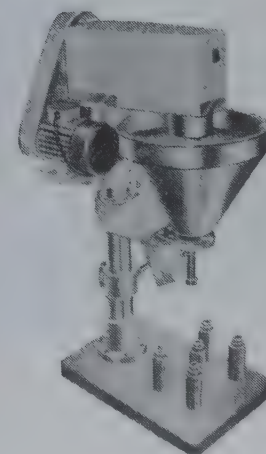
The N (B) series Granule Filling Machines from Bombay Engineering Industry are nett weight fillers in which a pre determined weight of the product is automatically weighed and then deposited into the empty container.

The product from the hopper is drawn out by two electric vibratory feeders and is fed into the weight bucket suspended from a sensitive weight beam. The machine can be set for any weight within its filling range.

These weigh fillers are suitable for filling all granular material, such as granules, flakes, cereals, grains, seeds, granulated pesticides, tea, cashew nuts, extruded food products, supari, plastic granules etc. Being a nett filler, it can fill into any type of pouch or rigid container as long as the opening of the container is not too small.



**Granule Filling Machine**



**Augur Filler**

Models come in N (B) 20, N (B) 100, N (B) 1000, N (B) 5000 for different weigh ranging from 2 gms. to 5 kg.

Auger fillers are volumetric powder filling machines which are most suitable for filling free-flowing and semi free-flowing powders into any type of container. The quantity of powder dosed out depends on the auger diameter, the pitch of the auger and the number of times the auger rotates inside the hopper. An electronic solid state feed controller which is plugged into the machine, controls the auger revolutions and thus the dose. By inter-



changeable auger and funnels the filling range can be spread out nearly 10 times from minimum to maximum.

The auger filler is most suitable for filling free-flowing powders, food powders like chilly powder, turmeric powder, powdered spices, cocoa, skimmed milk powder, masala powders, etc. Powders can be very efficiently packed with an auger filler.

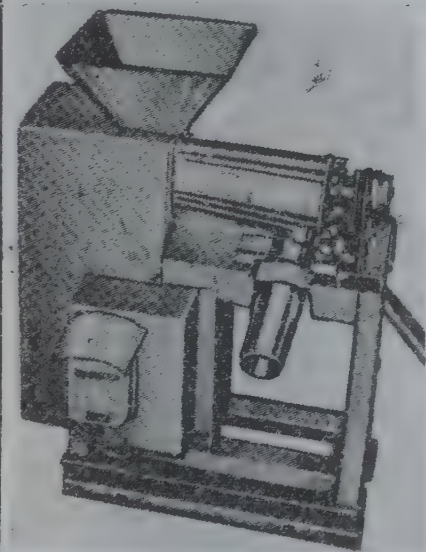
Models come in AU-50 Auger Filler and AU-500 Auger Filler for 2 gms. upto 500 gms.

*For your requirements, Contact :*

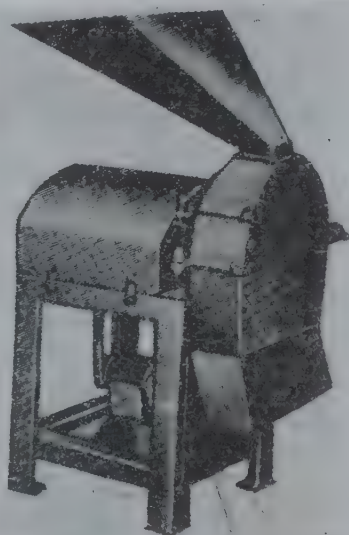
**Bombay Engineering Industry,**  
R.No. 6, (Extn.) Sevantibai Bhavan,  
Chimatpada, Marol Naka,  
Andheri (E), Bombay 400 059  
Tel : 836 93 68, 821 47 95  
Fax : 91-22-8327448

### FOOD PROCESSING MACHINES

The Company manufacture a wide range of food processing equipment such as Pulper Machine with capacity 1/2 tonnes/hr, Super-Pulper Machine with capacity of 1 to 1/2 tonnes/hr., Junior Pulper-Cum-Finisher with capacity of 1 tonnes/hr. The Mini-Pulper has a capacity of 500 kg per day suitable for extracting pulp from vegetables and fruit. Canning Retort, Fruit Crusher or Mill with fruit feeding hopper inside capacity: 700 kg to 1500 kg/hr.



Juice Extractor



Fruit Crusher

Also manufactured by Geeta Food Engineering are Jacket Pans, Exhaust Box, Juice Extractor, Coconut & Chilling, Grinding Machine, Bottle washing Machine, etc.

*For your requirement, contact:*

**Geeta Food Engineering,**  
Ashirwad Complex,  
Vashi Village,  
Opp. Starling Hospital, Gala No. 2,  
New Bombay 400 703.  
Tel : 022-7662098, 7667069  
Fax : 91-22-7667069.

### BISCUIT/BREAD BAKING OVENS

Admir Engineers are manufacturers of all types and any size of Gas & Oil Fired Automatic Biscuit & Bread Baking Traveling Ovens, which are designed to run Direct & Indirect Gas & Oil Fired for Biscuit & Bread Baking Plant, Barrel Drying, Tin Metal Printing etc.

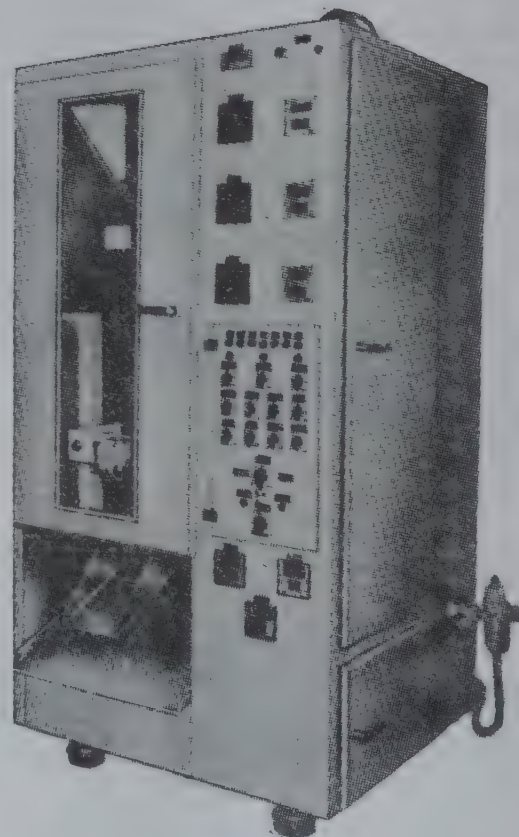
These Indirect Oil & Gas Fired Ovens are specially suited for all varieties of quality biscuit.

The ovens are more efficient in terms of baking performance and fuel consumption. The temperature profile for each variety of Biscuit is automatically maintained as per requirement. These ovens are in use all over India and Abroad.

*For further details, please contact:*

**Admir Enterprises**  
Plot No. 1/E-4  
Shivaji Nagar, Govandi  
Bombay 400 043  
Tel : (Office Cum Resi) 5568446, 5511718, 5518182  
Fax : 91-22-5568446

### PACKAGING MACHINES/MATERIAL



Samarpan, decades ago ushered in a revolution in Packaging Industry by introducing Flexible Packaging in collaboration with Prepac, France. This concept, over the years, has drastically changed the pattern of packaging in India. Samarpan, in its continued search for sophistication and improvements, has modified and developed machines to suit packing of liquids, semi solids and solids. Machines are designed in both automatic as well as semi automatic mode to cater to all types and size of industries. The range of machines is within the reach of all industries and can suit packing of Milk, Ghee, Vanaspati, Edible Oils, Lubricating Oils, Condiments, Detergents, Pesticides, Coffee, Tea, Snack Foods, Shampoo and many more.



Samarpan has collaborated with UVA Butler, Holland, for some machines for their powder/Granular products. Machines are offered with Auger filler, Cup filler or Linear Weighers.

Samarpan has now diversified into manufacture of Horizontal Flow Wrap Machines, High speed Sachet Packing Machines for powder and liquid in small quantities.

They also market combination weighers from Bilwinco of Denmark and sophisticated Form-Fill-Seal machines from UVA Butler. Besides, they have now started manufacturing Check Weighers and Metal Detectors in collaboration with LOMA of U.K.

Samarpan Fabricators Ltd. has also diversified into manufacturing packaging material. They manufacture Polyester and BOPP laminates with six colour Roto-gravure printing which are used for packing of food product and other consumer products.

*For further details, contact:*

**Samarpan Fabricators Ltd.**

Plot A-182/A-183, Lane Z, Road 16,

Wagle Industrial Estate,

Thane -400 604

Telex: 011-72329 SFL-IN.

Phone : 532 0373, 532 1842, 532 0029

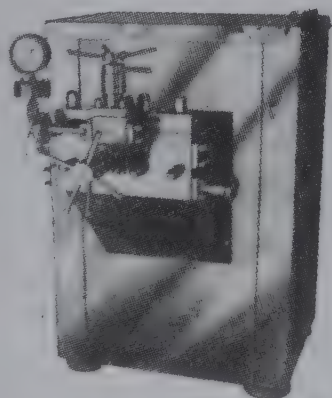
Fax : 91-22-532 0033

## HOMOGENISER

Goma Engineering Pvt. Ltd. has developed import substitute 100% indigenous high pressure Homogeniser for Dairy, Food, Pharmaceutical, Chemical, Cosmetic and the Biotechnological Industries.

The Company offers different models in the range from 50 to 18000 LPH and pressure upto 400 bar. The salient features of Homogeniser are High Pressure Triplex and Quintuplex Pump, two stage homogenising heads, all contact parts are made of special type of stainless steel and sanitary design for cleaning. It has the characteristics of new structure, easy operation, simple maintenance and labour saving in dismantling and assembling.

It can homogenise fluids like milk, ice cream, juice and all kinds of emulsion due to high pressure operations. The product becomes more easy to digest, absorb, smooth, stable and homogenous which gives more value addition to the product.



The Company has developed World Class Technology with the help of National Dairy Development Board. Some of their valued clients among others are Maharashtra Government Milk

Scheme. Parle Beverages Ltd., Pepsi Cadbury (I) Ltd., Raymonds, Shivanrut Dairy, Dukes, etc.

*For more details, contact:*

**Goma Engineering Pvt. Ltd.**

Majiwada, Behind Universal Petrol Pump,

Thane - 400 601 (Bombay).

Tel : 5340875 / 6436 / 1937 / 6121

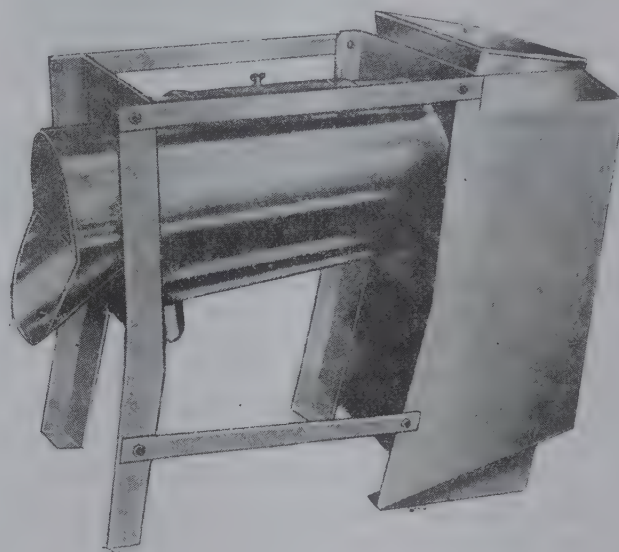
Fax No. : 0091-22-5333634

Tlx : 011-72389 TCWE IIN

## FOOD PROCESSING EQUIPMENT

Techno Equipments manufacture a range of food processing equipment such as Pulper, Pulper-cum-Finisher, Fruit Crusher, Juice Extractor, etc. as well as other equipment such as Bottle filler, Steam Jacketted Kettles, Conveyor Belt, Crown Corking Machines etc.

Their super model pulper shown below has a capacity of 1 to 1½ ton per hour inclined type and comes complete with two sieves and 5 H.P. motor while their junior model pulper has a capacity of ½ ton per hour with a 2 H.P. motor.



*For more details, contact :*

**Techno Equipments,**

31, Parekh Street, Saraswati Sadan,

Bombay - 400 004

Tel : 3851258, 5515640

Gram : FOOD EQUIP, Bombay -4

## ULTRA VIOLET WATER DISINFECTOR

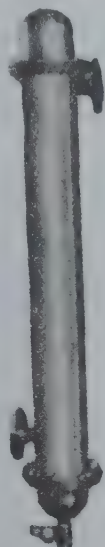
Komal UVK Series provide a compact design and economical Ultra Violet treatment for water application for a wide range of applications in Mineral Water manufacturing, Pharmaceutical, Drinking water, etc.

Komal manufacture UV Disinfector which has very high radiating U.V. Lamps which emits the killer U.V. wavelength 253.7nm. In its unique feature lamps are isolated from water by placing them inside specially fused quartz glass sleeves which emits 95% of the incident UV radiation. UVK Series of UV Disinfector having Dosage more than 30 micro sec/cm<sup>2</sup> can kill micro organisms most reliably.

Komal Disinfector asks for very little maintenance. It is provided with add-on accessories to help monitor and optimise its



performance. UV Disinfectors are available in various models having flow rate ranging from 500 lits/hr, 800 lits/hr, 2000 lits/hr, 5000 lits/hr. in stainless steel construction.



*For more details contact:*

**Komal Industries,**  
307, Goradia House,  
104, Kazi Sayed Street,  
Bombay 400 003.  
Tel : 344 6561/3447304  
Fax : 91-022-3446561.

#### SHRINK PACKING TECHNOLOGY AND MACHINERY

Based in Igatpuri, Nasik since 1985, Wonderpack Industries (P) Ltd. has established its credentials by way of its innovative approach in the field of thermoforming and unique range of machinery in the field of plastics and packaging. It offers a host of packing machines : from standard range of vacuum forming machines, automatic skin/blister packaging machines, shrink wrapping machines, scraples, thermoforming machines including dies and moulds to suit specific requirements.

The sturdy, versatile, easy to operate machinery offers fast changeover and ease of maintenance, W.P.I. has equipments with capabilities ranging from simple neck banding to customized system for the application of shrink sleeves and shrink labels.

The sleeve passes over a tetrahedron wedge, is refolded and then fed through the blades into the tooling. A tooling chamber is formed by the indexing disk and the stationary plates through which a plunger travels positively applying the sleeves in its final position. This construction allows almost unlimited change-over and greater economy.

These machines are driven by a central shaft to which all moving assemblies are tied with timing belts. This means that the timing of the machine is fixed and never needs adjustment; secondly when the machine is changed over the operator changes height, installs the change parts and is ready to re run. No timing or fine adjustment is necessary. This allows all models to be changed over in less than an hour thereby drastically reducing machine downtime.

Shrink sleeves in general can apply bands or sleeves to any shape products or containers- square, rectangular, oval or unique.

*For more details, contact :*

**Nitin Iyer- Marketing Manager**  
**Wonderpack Industries (P) Ltd.**  
P.O. Box 29127, 321 T.V. Industrial Estate,  
S.K. Ahire Marg, Worli.  
Bombay 400 025  
Tel : 494 95 80/493 47 36/ 493 6496  
Tlx : 011-71403 IDEM IN  
Fax : 91-22-4938796

#### AIRCURTAIN



Russell Aircurtains marketed by M/s. Donromos Pvt. Ltd. creates an uniform formidable barrier of air stream at an opening against heat, dust, smoke, odour and insects, without hindering the movement of people and merchandise in and out of the area. Manufactured by maintaining strict quality control right from procurement of raw materials to the final assembly line, it undergoes mandatory rigid tests before it leaves the factory premises. The radial flow configuration attained with specially designed body and impellers along with power efficient motors ensures air displacement at minimum noise levels. Its aesthetic elegance and sleekness matches all interiors and is available in Horizontal, Vertical and Portable models in powdercoated and Stainless steel bodies for commercial and industrial places.

*For further details, contact :*

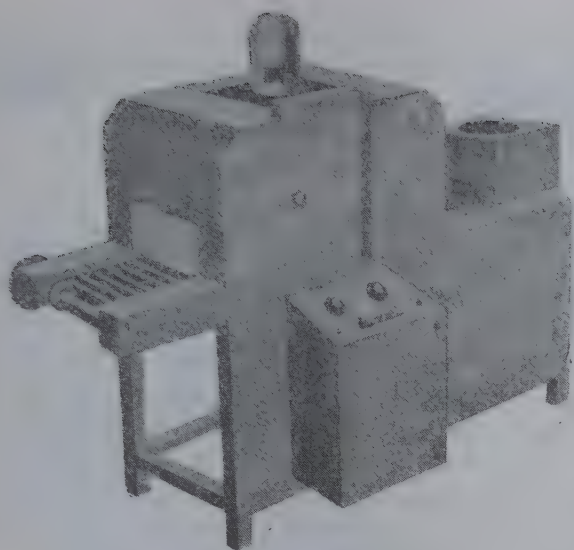
**Donromos Private Limited**  
A-4, Girikunj Industrial Estate, 34,  
Off Mahakali Caves Road,  
Andheri (East), Bombay 400 093  
Tel : 8328121 /8348633 /8348799  
Fax : 022-8324311, Gram : MIRDON

#### SHRINK WRAPPING MACHINE

Shrink Wrapping process involves the use off a heat shrink able plastic film which is wrapped around an individual or group of products. The product wrapped with the film is then passed through the Shrink Wrapping machine wherein the film shrinks in area and takes the shape of the enclosed product forming a tight, compact, neat pack. Shrink wrapping is versatile enough to pack any product of any size and shape. A product as small as a pin and as big as a truck can be shrink wrapped.

The basic advantages derived from shrink wrapping is that it is economical, involves reduction in operation time and labour, is pilfer proof, affords protection from weather, and gives enhanced sales appeal. It finds application for pesticides, pharmaceuticals, food products, consumer products, among others.





Aarkay manufactures a wide range of Shrink wrapping Machines Like Shrink chambers, Shrink tunnels, L-sealer tunnels, Web sealer tunnel, to cater to your packaging requirement, making it a simple reality.

For details write to :

**Aarkay Wrapping Machines Pvt. Ltd.**

1, Hormuzd,  
131, August Kranti Marg,  
Bombay 400 036  
Tel : 3670537, 3675277  
Gram : CRAFTWORLD

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Fibre & Fibre Products are manufacturers of Stirwel Stirrers, Mixers, Homogenisers, Agitators, Flocculators, Aerators, Emulsifiers and Clarifiers. These products find application in water & effluent threatment, adhesives, food & beverages, pharmaceuticals, chemicals, cosmetics, paints, dyes, etc.

For your requirements, contact :

**Fibre & Fibre Products**

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Bangur Nagar, Goregaon (W)  
Bombay 400 090  
Tel : 872 5510  
Fax : 872 7455.

### REFRIGERATION

Multifrig Marketing Co. Ltd. was started in 1978 as a Trading company in the field of Refrigeration. It soon established its name in the length and breadth of the country by supporting its products with excellent after-sales service. The Company offers a wide range of Refrigeration Products under its own well established brand name 'Chandra' - like Deep Freezers, Bottle Coolers, Ice Cream Cabinets, Visi Coolers, Water Coolers etc.

The Company has very efficient after sales service to its prestigious clients which is manned by Engineers & Technicians who are always at hand to keep the Unit working in perfect order. Even after the Warranty period of one year, our comprehensive service contract ensures that the products performance remain at the peak at all time.

Apart from the Corporate Office in New Delhi, the company has its Banch Office in Jaipur & Ghaziabad, supported by Deal-

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For more details, write to :

**Multifrig Marketing Co. (P) Ltd.**

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New Timber Market,

New Delhi 110 015.

Tel : 535376, 5416277

Fax : 011-5416040

### FREEZING/REFRIGERATION CONSULTANCY



Freezing has come a long way since Perkins proposed a hand operated compressor in 1831 and Linde's refrigeration machine using ammonia as refrigerant.

Different freezing techniques are employed for the same goal but each vary to a different degree in its efficiency. The different method employed in freezing are :

1) Cryogenic Freezing 2) Blast Freezing 3) Contact Freezing 4) IQF Freezing.

**Cryogenic Freezing :-** It is one of the best ways of freezing usually done by using liquid nitrogen.

**Blast Freezing :-** It is mainly used to freeze products which have large thickness especially meat and fish.

**Contact Freezing :-** It is mainly used for freezing fruit pulp and juices.

**IQF Freezing :-** It is most economical way of freezing which is done by freezing of particles individually in a fluidised mass without sticking to each other. It consists of processing line where the food stuff is washed, sliced, blanched and diced. After the product is chilled, it enters IQF Freezer where it is fluidised by blowing air at -40 deg.C. The product is then packed and kept in cold stroage at -25 deg. C till it is marketed.

Industrial Refrigeration offers techno-commercial consultancy for executing such turnkey projects and also install APV Freezer and Refrigerating system.

For further details, contact :

**Industrial Refrigeration,**

901, Market Chamber V,

Nariman Point,

Bombay 400 021.

Tel : 2041183 /89. Fax : 91-22-2044944.



## FOOD COLOURS

Narmada Food Colours Pvt. Ltd. is a unit of Dadajee Dhackjee Ltd. Group. Dadajee Dhackjee is a household name in edible food colours. Narmada Food Colours having its factory at Bhavnagar, Gujarat, is set up for exclusive manufacture of Primary Food Colours.

The Factory having R & D wing and qualified technical personnel lays importance on quality. The food colours conform to the specification laid down by the Bureau of Indian Standards.

With the vast dealer network and satisfied customers, Narmada Food Colours has made its presence felt in the food colour industry. Today it is one of the leading brands in India. Sizeable quantities have also been exported.

*For further details, please contact :*

**Narmada Food Colours Pvt. Ltd.**  
56/58, Garibdas St., Vadgadi,  
Bombay 400 003  
Tel : 3424161/62. Fax : 21-91-3432854

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Man's early search for microbe and eventual study of this tiny world of the microbe is today a flourishing science of microbiology. This science as we know, depends on numerous growth supporting culture media. Used for invitro testing and identification of microbial presence, these culture media are an invaluable tool in diagnostic laboratories and in pharmaceutical quality control.

Culture media find application in Dairy, Breweries & Distilleries, Bakeries & Food Processing, Pharmaceutical & Cosmetics, Immunological Research, Cancer Research, Pharmacology, Testing Purity of Drinking water, Plant Tissue Culture, and in Floriculture.

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Tel: 515 0970, 515 1607  
Grams: STERILITY  
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and high viscosity grades. They are used as thickeners, gelling agents, emulsifying agents, stabilizing agents, water holding agents and disintegrants in food, textile, paper, explosives, ceramics, pharmaceutical and various other industries. They are sold under various trade names such as, Manutex, Manugel, Superloids, Kelmar, Dariloids, Manucol, Kelacids, etc.

Xanthan gum are produced by aerobic submerged fermentation and are identical to the polysaccharide formed by the bacterium *Xanthomonas campestris*. Selected Kelco xanthan gums are used in the overseas market for confectionery, dairy products like ice creams, sherbets, sour creams etc., desserts like puddings, mousses, etc. bakery goods, pie fillings, flavoured emulsions, beverages, frozen fruits, dry mixes, dietetic foods (as a partial replacement for starch), sauces, toppings etc. They are sold under the trade names of Kelzans (industrial grade) and Keltrols (food grade).

*For your requirements, contact:*

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Tel : 4944616, 4921255  
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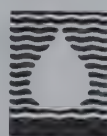
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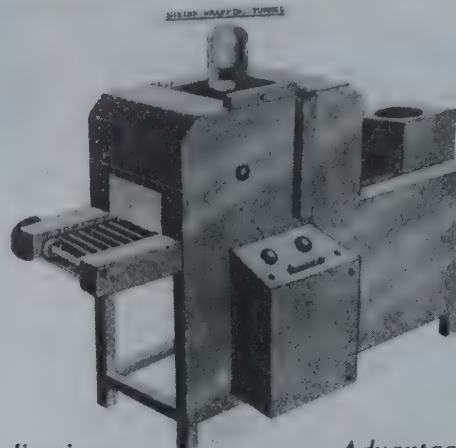
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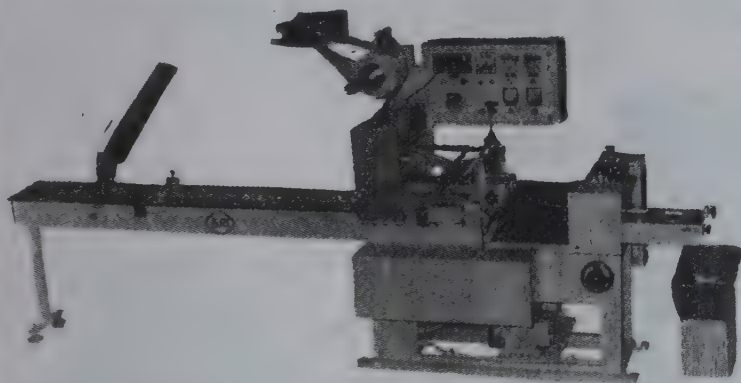
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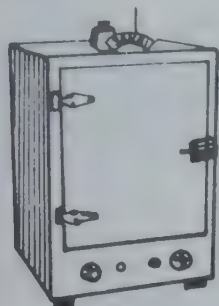
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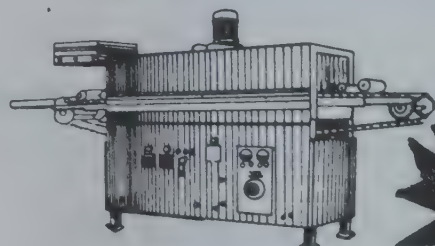
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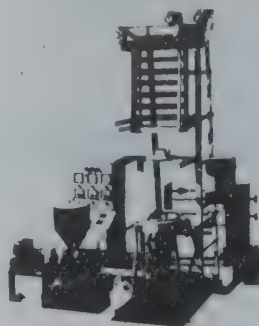
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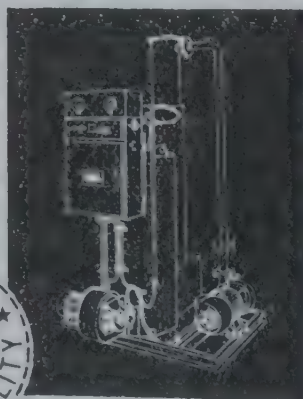
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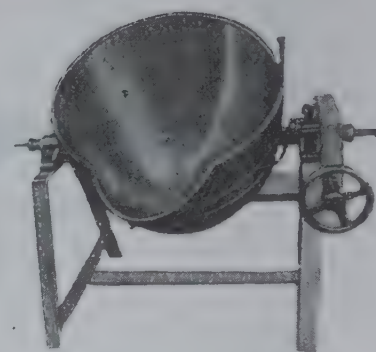
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  - \* HOTELS / RESTAURANTS / PUBS**
  - \* HOSPITALS / NURSING HOMES**
  - \* PHARMACEUTICAL / COSMETICS**
- 
- Superior Method of Sterilizing/Fumigating/Deodourizing**
  - Higher & Consistent Drop in Bacterial Growth**
  - Eliminates all Types of Odours**
  - Easy to use & install**
  - No recurring expenditure on consummables**
  - Consumes very low electricity**

*FOR MORE INFORMATION, CONTACT:*

**THOR SYSTEMS**

**( A DIVISION OF )**

**SURGER EXIM INC.**

206 BAKE HOUSE

MAHARASHTRA CHAMBER OF COMMERCE LANE

KALAGODHA, FORT, BOMBAY 400 023 INDIA.

TEL : 2846222 \* FAX : 91-22-2057448





## ULTRAVIOLET SYSTEMS

Hitech Ultra Violet systems eliminate oxides and other contaminants in ultra pure water by using only Teflon and PVC as parts which contact water. The excellent ultra transmission characteristics of Teflon contains a higher ultra violet field which results in a better kill of micro organisms.

A special water flow pattern through the Teflon tube assures turbulence and full exposures to the ultra violet rays. High turbulence and non wetting characteristics of Teflon eliminate any built-up of contaminants that could block ultra violet rays. Hence no wiper of chemical additives system are necessary. Separation of fluid circuitry from electrical circuitry allows the lamps to operate continuously even without water. This also allow the ultra violet lamps to operate at their optimum operation temperature so they can produce optimum ultra violet light.

Hitech Ultraviolet also manufacture TOC (Total Organic Carbon) reduction Sterilizers which oxides organics into carbon dioxide gas.

Application: Aquaculture, Beverage Industries, Breweries, Dairies, Water Bottlers, R.O.Systems, Wash Water for Food products such as vegetables, fruit, fish etc. Toxic Chemical Distribution, etc. Pharmaceuticals and Cosmetics Industries, Hospitals, Laboratories, etc.

Hitech Ultraviolet manufactures Sterilisers in various capacities depending on the flow rate required by each application and maximum capacity of 12 lac. L.P.H.

*For more details, write to :*

**Hitech Ultraviolet,**  
P.B. 8356, 35 Grace Plaza,  
S.V. Road, Jogeshwari (West)  
Bombay 400 102  
Tel : 6244327, 6704610/11  
Fax : 6244337

## COATINGS

Everest Supreme Coating has excellent corrosion resistance exterior durability and unsurpassed toughness of polyurethanes. These properties best utilized in formulation of the coating, serves to make the metals & surface resistant to water, rains, acidic-fumes, chemical/solvent gases, atmospheric hazards etc. normally encountered, thus enhancing the life of structures, equipments, vessels, plants & machineries. It can be had in matt finish and used as most effective prime coating/top coat.

Compared to synthetic metal primers or zinc chromate primers at a little extra cost it gives excellent protective base coating -- a super paints or various types of climate conditions or chemically contaminated (polluted) atmospheres.

**Application :** Everest Coating is available in ready-to-use packs and is simple in application being applied straight to bare metal/surface, if fresh, new & exposed, when dry, cool and clean, no mixing is needed. It can be applied by brush spray or roller as convenient.

*For futher details, contact:*

**Manikant Brothers**  
311, New Anant Bhawan,  
256/65, Narsi Natha Street,  
Bombay 400 009.  
Tel: 375 69 77/ 375 28 81. Fax: 3738189

## FOOD INGREDIENTS

Olin Chemicals are dealers, importers & suppliers of Food Grade Chemicals. The company offers a wide product range of Antioxidants, Aromatic Chemicals, Enzymes, Natural Essential Oils, Natural Food Colours, Gums, Waxes and Solvents. The company supplies Food Grade Chemicals in Pharmaceutical Essences & Flavours, Ice Cream, Confectionery, Beverages & Processed Food Industries. Also, the company introduces speciality dairy chemicals like Rennet, Dairy Cultures (for making Cheese, Yoghurt, Dahi) & Antioxidants & Anti Fungus Agents.

*For your requirements, please contact :*

**Mr. Rajesh R. Sanghvi,**  
**Olin Chemicals,**  
A-303, Padmavati Nagar,  
Gen. Arunkumar Vaidya Marg,  
Goregaon (E),  
Bombay 400 063.  
Tel : 840 69 88, 841 31 11  
Fax : 873 43 32

## TOTAL WATER MANAGEMENT

Ion Exchange India offers the beverage industry the benefits of Total Water Management - the result of three decades of experience and a complete spectrum of world class technologies. Our systems incorporate both conventional processes as well as advanced separation techniques, such as reverse osmosis and micron filtration; they extend from treatment of raw water right upto waste water treatment and recycling of bottle wash water for reuse. Clients have greatly benefitted from our single source solutions that provide products of international quality.

Among the products that Ion Exchange India offers for treatment of high turbidity water are:

- \* Lamella clarifiers with multigrade filters - ideal to bring down suspended solids to below 5 ppm in raw water
- \* Reverse osmosis units upwards of 100 litres/hr, for water with high dissolved solids
- \* Softeners for bottle washing and low pressure boilers
- \* Custom-built demineralisation plants for high pressure boilers and processes
- \* Fine filtration systems upto 0.2 microns
- \* Ultrafiltration systems for bacteria removal
- \* Custom-built plants for waste water treatment and recycling of water
- \* pH, conductivity, turbidity and dissolved oxygen meters for testing water quality.

*For more information contact:*

Marketing Department  
**Ion Exchange (India) Ltd.**  
Tiecicon House,  
Dr. E. Moses Road,  
Bombay 400 011.  
Tel : 022-4939520/23/25/31/32  
Fax : 022-493 8737

## PRESSURE PIPES

Hobas India are interested to contact Manufacturers-Businessmen Financiers - Enterpreneurs in India, for the setting up a computerised Plant for the manufacture of Glass Fibre Reinforced Pressure Pipes for use in the Transmission of water /



sewage / chemicals for domestic consumption.

\* Pipes are produced by centrifugal moulds; the Pipes are of outstanding quality with high stiffness and can replace steel, cast iron, asbestos cement and any other glass fibre pipes quality wise and cost wise; completely computerised process and quality tested every day; easy to install pipes due to light weight and excellent couplings; not affected by chemicals - corrosion and bacteria; completely leak proof; can last hundreds of years; raw materials required are available in India; pipes can be produced cheaper and faster than any other pipes on the market; eco friendly.

Hobas has nineteen factories in operation using this new technology all over the world and seven more factories coming up in the near future.

Hobas can build a Plant on a Turnkey basis with minimum two feeders. (Plant designed for six feeders) Approximate cost sixteen million US Dollars (excluding cost of land) It is possible to write-off investment with full production in two years time.

*For further information contact:*

**Mr. Sam Levi**

**Consultant to the Austrian Trade Commissioner in India**  
Phone 284 2286. Fax : 282 4830

#### SWEETS



In the heart of the city, at the busy Kempegowda Circle is Arya Bhavan Sweets, a superior quality sweets shop first opened twenty years ago. Arya Bhavan Sweets has two other outlets in Bangalore. Even older than the Bangalore outlets is the 50 years old shop at Madurai. It is quite easily amongst the oldest sweets shop in South India.

Arya Bhavan Sweets are also available at Madras, Coimbatore and Kodaikanal.

Highly popular everywhere, Arya Bhavan Sweets offers a big variety of sweets. Many of them have become people's favourites over the years.

*For further requirement, contact :*

**Arya Bhavan Sweets**  
1 Santosh Shopping Arcade,  
Kempe Gowda Circle,  
Bangalore 560 009.  
Tel : 2871175, 2874589

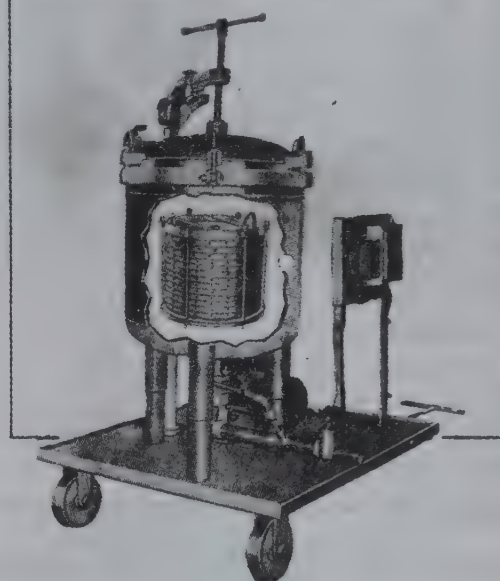
#### HORIZONTAL PLATE TYPE FILTER PRESS

S.F. Engineering Works manufacture stainless steel & mild

steel Horizontal Plate type Filter Press. This is a compact unit for clear filtration of liquid chemicals, most liquid pharmaceuticals, cosmetics, beverages, etc., consisting of a strong stainless steel mild steel tank with top cover and tightening bolts, a filtering arranged disc type filter plates with perforated screens, filter media and interlocking cups. The Filter Press is coupled with a stainless steel or cast iron pump with motor and mounted on a portable base covered with Mild or Stainless Steel sheet and also provided with ball-bearing castors.

The operating principle of the Filter Press is very simple. The liquid to be filtered is passed on to the Filter Tank by the Transfer Pump. A Cartridge Plate Assembly consisting of several Filter Plates arranged with supporting Screens, Filter Media and interlocking Cups, is fitted in the filter tank. The liquid in the tank finds its way to the top of the plates through the circular opening on the side of the plates. The Filter media arrests suspensions and allows the filtrate to pass through them and the screens and to run down the central vertical channel formed by the interlocking cups. It then goes out the outlet pipe.

**SECTIONAL VIEW OF FILTER TANK WITH CARTRIDGE PLATE ASSEMBLY**



This type of filter press is primarily used for obtaining filtrate, however, in certain cases cakes can also be obtained in the space between the plates.

Our standard model Filter Press consists of 6 plates of 8" dia with 0.189 m<sup>2</sup> (2 Sq. Ft.) filtering area and fitted with 1/2" size stainless steel gear pump. Large capacity filters are available with filter plates of 14", 18", 24", 33" dia. The capacities are given in the adjoining table.

*For more details, contact :*

**S.F. Engineering Works**  
6th, Kharwagali, Gala No. 7,  
Kumbharwada,  
Bombay - 400 004  
Phone : 3824990 / 3086331

#### WATER DISINFECTION/PERSERVATION

Electro-Katadyn, the product of M/s Katadyn of Switzerland are available for Indian markets. Katadyn are pioneers in water purification by silver, with their 1926 patent (19882-46).

The bactericidal effect of silver is known from ancient times.



Silver foils were used for treating wounds and silver vessels for water storage. The Swiss biologist Naegeli performed pioneering work in this phenomena and the Germany Physicist Krause development commercially viable process for the disinfection of water.

Krause adopted the term Katadyn, a fusion of "catalytic" Germany : (**KATA** and **OligoDYNamic**). The 'KATADYN' effect is the destruction of microorganisms by a catalytic method, by the action of dissolved silver.

Silver is effective against the entire range of bacteria and algae. For disinfection, the contact time with silver must be at least one hour.

#### Method

The silver is added to the water in the form of monovalent cations. Admixing is carried out electrolytically by means of the Electro-Katadyn method.

It operates on single phase A.C. Supply. Low electricity consumption (between 30 W to 70 W) and long life of silver anode are the special features of Electro-Katadyn.

#### Applications

\* Beverage Industry :- Disinfection and preservation of production water, elimination of wild yeasts and bacteria, last rinsing in bottle washing machines, spraying of containers, barrels, pipes and tanks, production of mist. \* Wine Treatment:- Elimination of wine defects (goatish taste) due to sulphur. \* Food Industry :- treatment of production and wash water in canning factories and fish processing, washing, butter, grain, production of ice and scrapped ice for use in sausage production \* Drinking water schemes (Hotel, Shipping, Defence).

*For more details, contact :*

**Madhura International,**  
13 (M)/2, Sakalnagar,  
Baner Road,  
Pune 411 007  
Fax : (0212) 350288

### BEER TRAP FILTRATION

During the processing of beer, clarification and/or stabilisation has traditionally been achieved by filtration with Kieselguhr or PVPP. Because of their design and the filtration principles upon which they are based, even the most sophisticated systems will bleed quantities of filter aid into the filtered beer. This is undesirable for the following reasons:

1) Lower standard of clarity. 2) Presence of quantitative amounts of particles in the beer. 3) Can lower the efficiency of pasteurisation by shielding spoilage micro-organisms which are present. 4) The abrasive nature of the filter aid particles will eventually damage valve seats and other process equipment's systems located downstream. 5) contamination of downstream storage vessels and associated valving and pipe work.

At times, when the process pump stops suddenly during a power failure, a large quantity of power is released downstream because of filter cake breakdown.

To solve the problem: The installation of the new, absolute rated Profile Star TF trap filter between the Kieselguhr filter and the bright beer tank will remove powder 'bleed' material and will prevent large 'slugs' of filter cake from contaminating the process.

Profile Star TF is a major development in filter technology.

Due to their proprietary construction, these filters deliver the benefits of both traditional pleated polypropylene and depth type filters - the ideal combination for extraordinarily high dirt holding capacity and long service life.

The dirt holding capacity is further enhanced by the ability of the filter to withstand rigorous cleaning by backflushing. Pall & Filtech offer competent Technical Support in establishing filters cleaning protocols, and training operators. The filters can be sanitised using most of the common brewery sterilants.

Powder fines will eventually penetrate into the filter medium and block the filter medium irreversibly. However, as Profile Star TF filters are designed for very high dirt capacity, it takes a long time before the fine powder material blocks the filter and changeout is required. Typically, a 20" long filter module lasts for about 4000 HL.

Profile Star TF filtration systems are easy to install and use. Even so, Filtech provides installation assistance and training on request to help the Brewer get it right the first time.

Profile Star TF filtration systems are available to brewers in India from Filtech Pharmalab.

*For more details, contact:*

**Filtech Pharmalab pvt. Ltd.**  
Star Metal Compound, L.B.S. Marg,  
Vikhroli,  
Bombay 400 083.  
Tel : 5782559. Cable : PALL FILTER  
Tlx : 11-71934 PL IN, Fax : 91-22-5785329.

### CHEMICALS, FINE

Manish Chemicals are wholesalers and retail dealers in Milk Powder, Citric Acid, GMS, Calcium Propionate, Cream of Tartar, Cocoa Powder, Peppermint Oil, Tartaric Acid, Gelatine, Stearic Acid, Ajinomoto, Sodium Benzoic, Saccharine.

Other Products supplied by them are Naphthalene Balls, Air Freshner, Sanitaryware.

*For your requirements, contact:*

**Manish Chemicals**  
106, Bhandari St.,  
Maskai Bldg., 2nd Fl., Rm. No. 24,  
Bombay 400 003.  
Tel : 3400296/3411302

### STERILIZING/FUMIGATING/DEODOURIZING

The Thoronator series from Thor Systems (a division of Surger Exim Inc.) consists of amazing revolutionary range of products used for Sterilizing/Fumigating/Deodourizing critical areas of the following industries:

Hospitals, Nursing Homes, Pharmaceutical, Cosmetic, Food, Beverage, Canning, Bottling, Cold Storage, Hotels/Restaurants/Pubs, Confectioneries and Bakeries.

The series consists of various Models used for specific application industry and the area sought to be covered. Various models make up the THORONATOR SERIES. Each model is only one of it's kind available in Asia. Each is a compact unit, containing no moving parts and does not require any maintainence.



It comes with a one year replacement warranty against any manufacturing defects. It is very simple to install and use as all it takes is to plug it into any 3 pin, 5 Ampere socket and may be used for a continuous period of 24 hours or longer depending upon User's requirement.

The THORONATOR models have been used and proven to be highly effective than the currently used Sterilizing/Fumigation procedures. They are also used for Deodourising areas typically found to have persistent bad and foul odours, such as Morgues, Laboratories, Hospital Kitchens and canteens, Cold Storage rooms, Conference Rooms, Auditoriums, Libraries, Toilets, etc.

The THORONATOR SERIES are a highly cost effective solution, saving an enormous amount of manpower and time which is otherwise required using current Sterilizing/Fumigation, besides the bonus of no leftover odours of Sterilization/Fumigation. It is far superior system, as it reaches areas which are normally not accessed during currently used Sterilizing/Fumigation procedures. Also, it is very simple to install and use without any recurring expenditure on consumables. It consumes very little Electricity.

THE THORONATOR SERIES have been extensively put under trials at various Hospitals and Independent Labs, and Pre and Post usage AERIAL BACTERIAL COUNT was taken. It was observed that there was a consistent and substantial drop in the Bacterial colonies vis-a-vis currently used Sterilizing/Fumigation procedures. The THORONATOR SERIES can also be used in areas currently protected by HEPA Filters and laminator air flow systems leading to still better sterility conditions and increase in the life of the HEPA FILTERS.

*For more information, please contact:*

#### **THOR SYSTEMS**

**(A Division of SURGER EXIM INC.)**

206 Bake House, Maharashtra Chamber of Commerce Lane, Kalagodha, Fort, Bombay 400 023.

Tel : 284 6222. Felefax: 205 7448

#### **THREE PASS STEAM BOILER**

Ross manufactures fully automatic, highly efficient three pass steam boilers. The units are vertical, compact and easy to install, operate and maintain.

The boiler is a forced draft, forced circulation, water tube, coil type unit. It has a high thermal efficiency of as fuel 87 +/- 2%. It can operate on kerosene, diesel, gas etc. The capacities range from 50kg/hr to 600 kg/hr in Non-IBR range and above 600 kg/hr in semi-IBR and IBR range.

The units are standard and are proven in the field with over 200 installations. They are typically installed in various industries like dairy, food & beverage, chemical, pharmaceutical, textile, paper etc.

Ross also manufacture hot water generators, steam boilers thermic fluid heaters, hot air generators, food friers and other process heat equipment.

*For further details, please contact:*

#### **Ross Thermal Systems Pvt. Ltd.**

33, Burhani Industrial Estate, Kondhwa (BK),

Pune 411 048

Tel : 630129/676518

#### **TURNKEY PROJECTS**

Filtron Engineers Limited is one of the leading engineering Companies in India, engaged in design, manufacture, supply, erection, installation and commissioning of equipment required by Food, Dairy, Fruit, Vegetable, Chemical and Pharmaceutical Processing Industries. The Company undertakes all types of Turn-key projects for the above mentioned sectors. Filtron also represents many European Companies for products like Homogenisers, Fruit Processing lines, Date Processing lines etc.

*For further detail, please contact:*

#### **Filtron Engineers Limited**

117 A, Vittlalwadi Road

Pune 411 030

Tel : 091-212-440068, 444079

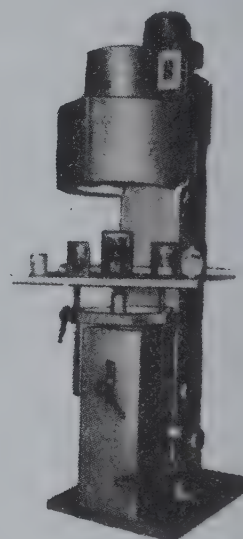
Fax : 091-212-477913

TLx : 0145-7323 TRON-IN

Gram : NORTLIF

#### **CANNING MACHINES**

The company are manufacturers and exporters of Automatic/Semi-Automatic Tin can making plant and machinery for all shapes and sizes. Machines are very useful for closing filled tins and also for tin manufacturers. The machines have earned great reputation for their trouble free performance and maintenance, both in India and abroad.



*For further details please contact:*

#### **Tinmaco Engg. Co. (Bombay) Pvt. Ltd.**

Plot No. A167 Road No. 21, Wagle Industrial Estate Thane - 400 604.

Tel : 5320802, 5321465, 5649291

Resi : 5603578, 5670239

Fax : 91-22-5320193, 91-22-5322682

Telex : 1-72389 TCWE IN.

#### **ELECTROPOLISHING SERVICES**

Bhap Trading Pvt. Ltd. was incorporated on 22 January 1991, and from an initial turnover of only Rs. 1.65 lakhs in the first year, the turnover jumped to Rs. 14.44 lakhs in the year ending March 1993. The company plans to diversify into innovative



products of electropolishing in the coming year.

Electropolishing or Scientifically Electro Chemical Polishing is selectively removing metal from the specimen in a controlled manner to give uniform, smooth and bright finish to the surface. It is in fact the reduction of the thickness of the deformed layer of metal as a result of its dissolution, and the development of a bright and decorative finish. The quality of the surface finish depends on the surface condition of the work piece. Electropolished surfaces are smooth and free from microscopic cracks, metallurgically clean and free from stress, free from burrs, fragments and gas occlusions, and highly hygienic and free from bacterial growth. Besides being bright and decorative, it improves corrosion resistant and durability.

Due to these qualities, electropolishing finds application in areas such as dairy industries, beverages, breweries and chemical industries, pharmaceutical industries, high purity gas systems, kitchenware and domestic appliances, atomic and scientific centres.

The company has three directors on the board: Arvind M. Mody, Bijal A. Mody and P.A. Mody.

*For your requirements, contact:*

**Bhap Trading Pvt. Ltd.**

52, Nagdevi X Lane,  
Bombay 400 003.

Tel : (0265) 3447425. Fax : 3424758.

Factory : C-1/798 GIDC Industrial Estate,  
Makarpura, Baroda 390 010.

Tel/Fax : (0265) 442435

#### STARCH/SOLVENT CHEMICALS

Vertex Chemicals are suppliers of all types of starch, liquid glucose (confectionery & pharma grade), yellow and white dextrine, sorbitol 70%, dextrose mono-hydrate, malto dextrine, pregeletanised starch (all grades) soya lecithin, malt extract, and all types of solvent chemicals

*For your requirements, contact:*

**Vertex Chemicals**

301-B Heritage House,  
Gundavli Cross Rd., No. 2,  
Andheri (E),  
Bombay 400 069.  
Tel/Fax: 821 8004.

#### TURNKEY PROJECTS

Chengalva Engineering Pvt. Ltd., was promoted by a highly qualified Technocrat in 1987 for the manufacture of Dairy / Food Processing equipments. We now offer turnkey project right from concept to commissioning for the following areas :

Dairy Plants\* Food Processing / Fruit Concentration Plants\*  
Poultry\* Meat Processing\* Breweries

We also specialise in the following equipment :

SS Top Churn for manufacturing Table Butter; Total Cheese Plants; Agitated Thin Film Evaporators (ATFE).

Our major clients includes National Dairy Development Board, Procter & Gamble, Vadilal International, VST Industries, Coca-cola, Charminar Breweries, Heritage Foods, Briggs Burton and Indian Dairy Specialities & A.P. Dairy.

*For further details, contact :*

**Chengalva Engineering Pvt. Ltd.**

9, Bhagyalaxmi Nagar Colony,  
Gandhi Nagar,  
Hyderabad - 500 380  
Tel : 7612023, 7613175  
Tlx : 0425-6333 PCO IN  
Fax : 091-40-841697

#### PECTINS

Vidarbha Fruit Products Pvt. Ltd. now manufacture International Standard Pectins at its highly sophisticated modern plant.

The product range comprise Citrus pectins, Lime Oil, Processed Lime products such as juice concentrate, squash, cordial, etc.

*For your requirements, contact:*

**Vidarbha Fruit Products Pvt. Ltd.**

B/1 Rajdarshan Basement -B  
Opp. Rly. Platform No. 1,  
Thane (W), 400 602.  
Tel : (022) 5404782  
Fact: (07234) 27049.

#### CARAMEL COLOUR

Sayaji Sethness Ltd. - a joint venture company promoted by Sayaji Industries Ltd. (Ahmedabad) and Sethness Products Co. (USA) manufacture Caramel Colours ranging from delicate yellow to the darkest browns, used for improving taste and appearance to foods and beverages.

Over a century from 1880 the company have developed and standardized the manufacturing process to obtain a product that meets the highest standards.

The Caramel Colour finds application in dark breads, cookies, cake mixes, gravy & gravy bases, soy sauce, condiments, cocoa/chocolate, candy/liquorice, cereals, soups and a range of other products.

*For your requirements, contact:*

**Sayaji Sethness Ltd.**

17/18 GVMM, Odhav,  
Ahmedabad 382 410.  
Tel : (079) 875100  
Fax : (079) 871338.

#### BISCUIT/BREAD BAKING OVENS

Aifso's continuous converised type automatic direct & indirect gas and oil fired Ovens are of most modern design in respect of fuel consumption and uniform baking/drying quality. These ovens are supplied all over India and abroad to reputed companies like Parle's, Britannia's, Bakemans, and the metal decorating and barrel Drying Ovens to Companies like Poysha, Balmer Lawrie, Larsen & Toubro among others.

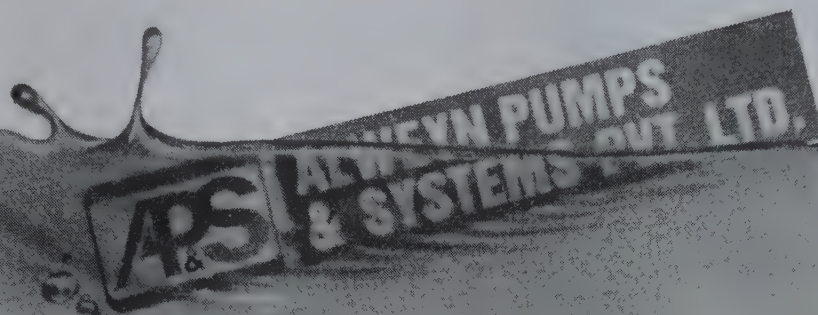
*For further details, contact:*

**Aifso Enterprises**

A/1, Veena Beena Apts., Sewri (West)  
Bombay 400 015.  
Tel : 413 09 26, 413 73 39, 413 71 09  
Fax : 91-22-413 73 39.



# To know the Alweyn Range for fluid process applications. Get to the bottom...



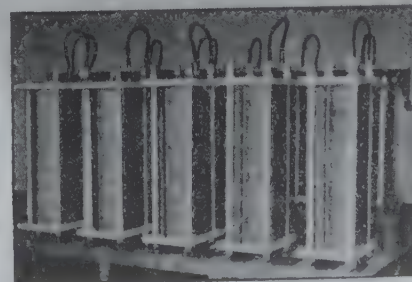
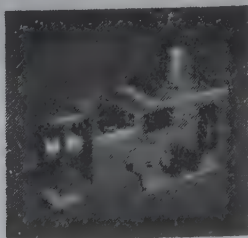
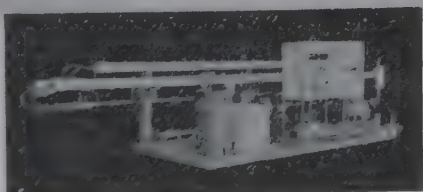
Not that we have anything to hide but such claims as it would occur to you, better be investigated, specially when 'clarity' happens to be a very pertinent aspect. So, the best place you'll look is underneath, and what would you find...

A world of expertise and fine-tuned technology in every conceivable areas of fluid process applications. From waste water treatment, water treatment, mineral water plants to membrane separation systems, concentration systems in (R.O., U.F., M.F., N.F.) for Food processing, and Dairy applications, specifically for concentration/de-mineralisation for whey, proteins, lactose, milk. Membrane Separation Systems also find extensive use in Industries such as Textile, Pharmaceutical, Bio-engineering, Power generation, Petroleum, Gas and mining and more for a host of productive advantages. We owe this to our string of foreign collaborators, who are leaders in their respective fields.

On further exploration you'll discover we also manufacture Triplex pumps – a 90% energy efficient work horses for use in Reverse Osmosis, Boiler feed, oil rigs, Die casting accumulators etc. And metering pumps for dosing of toxic liquids, corrosive chemicals, abrasive slurries.

At the end of it all, your observations will filter down to one thing or more precisely the bottom line – Alweyn Pumps and Systems Pvt. Ltd.

The one stop solution for fluid process applications.



**Head Office** : 62, Apollo Industrial Estate, Off. Mahakali Caves Road, Andheri (E), Bombay 400 093.  
Tel: (022) 8327467 Tel./Fax: (022) 8362688/8214026 Telegram: ALWEYN FAM BOMBAY-59.  
**Factory** : SF No. 426/2A, 427/1A, 1B, Nehru Nagar, Kalapatti, Coimbatore-641035, Tamil Nadu  
Tel./Fax: (022) 574856.

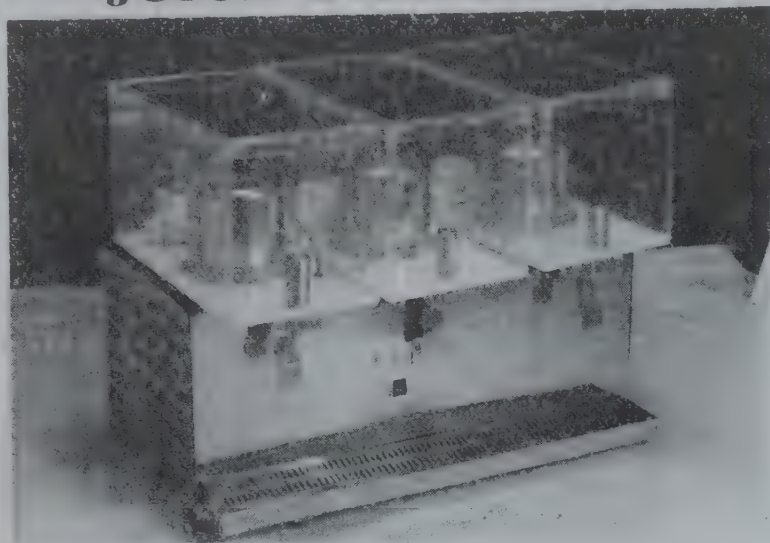


Tel (Factory) : 5647055 \* Fax : 5649890

## VARUN REFRIGERATION

Unit No. 115, 3rd Fl., Nahar & Seth Indl. Estate, Pannalal Mills Compd., L.B.S. Marg, Bhandup (W) Bombay 400 078

MANUFACTURERS OF:  
**JUICE DISPENSERS**



Available in 3 Models

VRA/345 Triple Container  
VRA/240 Double Container  
VRA/120 Single Container

Basically Developed for

Fast Food Kiosks, Airports,  
Picnic Spots, Railway Stations,  
BusStands, Canteens, Theatres.

## INGREDIENTS FOR FOOD & BEVERAGES INDUSTRIES

- |  |                     |
|--|---------------------|
| * RENNET                                   | * DAIRY CULTURES    |
| * SORBIC ACID                              | * POTASSIUM SORBATE |
| * CITRIC ACID                              | * SODIUM CITRATE    |
| * ASCORBIC ACID                            | * PECTIN            |
| * BHA                                      | * DIACETYL          |
| * GUMS                                     | * WAXES             |
| * VANILLIN                                 | * ETHYL VANILLIN    |
| * ENZYMES (FOR FOOD PROCESSING INDUSTRIES) |                     |
| * NATURAL ESSENTIAL OILS                   |                     |
| * NATURAL FOOD COLOURS                     |                     |

**ALL TYPES OF FOOD GRADE CHEMICALS**

*Please Contact:*

## OLIN CHEMICALS

A-303, Padmavati Nagar

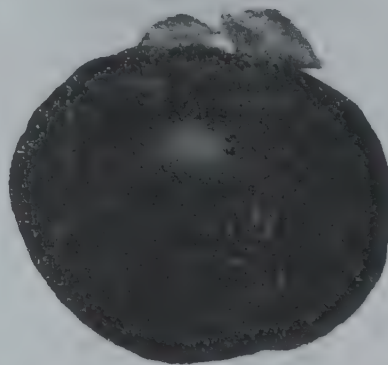
Gen. Arunkumar Vaidya Marg

Goregaon (East), Bombay - 400 063

Tel : 840 69 88, 841 31 11 \* Fax: 873 4332



**Robert's**



# ROBERT WALTER & CO (FOOD PROCESSORS) PVT. LTD.

*Manufacturers of:*

**Tomato Ketchup, Jams, Vinegars**

313, Milan Industrial Estate, Off Tokershi Jivraj Road  
Bombay 400 033  
Tel : 413 7669



# BUYERS' GUIDE — Part 1

## MANUFACTURERS OF FOOD & BEVERAGE PRODUCTS

### AERATED WATER

Hajoori & Sons, Udhna  
Magdalla Rd., Surat 395002. Tel:  
632141/42. Fax: (0261) 632 110.

### BAKERY PRODUCTS

Super Bakers (I) Ltd., Plot No.  
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Plot 3, New Panvel 410 207.

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Industrial Suburb, Junkur Rd.,  
Bangalore 560 022. Tel: 3375867,  
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Champion Food India, New  
Janta Nagar, Near Arora Palace,  
Gill Rd., Ludhiana 141 003. Tel:  
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Hary's Food Products, East  
Cross 32, Ashoka Road, P.B. No.  
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Gola-Ka-Mandir, P.O. Residency,  
Gwalior 474 005.

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Ranjit Liladhar Pvt. Ltd. -- See  
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### ICE CREAM

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Road, P.O., Madras 600 084. Tel:  
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532541, 521708, Tlx: 0715-253.

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Sun Shine Food Products, F-88-89, Bichhwal Indl. Area, Bikaner, 334 002. Tel : 61074, Tlx : 3505-19.

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Kalyan Products, Kuttanellur, Trichur 680 014.

Mangala Foods, Palakulangara, P.O. Taliparamba 670 141, Kannur, Kerala.

Pandian Pickles Company, 87, Thathaneri Main Road, Madurai 625 018. Tel : 42128.

V.P. Bedekar & Sons Pvt. Ltd., Bedekar Sadan, 56 Taty Gharpure Path, Girgaum, Bombay 400 004. Tel : 385 6673, 388 4176. Gram : BEDEMASALA, Bombay. Fax : 3859552.

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Tandon Drinks Company, Jhanjh Gate, Jind 126 102, Haryana. Tel : 01532-73222.

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## SESAME SEEDS

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IFCA Bottling Company Ltd., New Indl. Extn. Area, Gangyaz, Jammu (Tawi) - 180 010, J & K. Tel : 531028, 531096, 531541.

## SOUP MIXES

Savvy Foods (India), No. 86, Rangaswamy Temple Street, Bangalore 560 053.

## SOYA MILK

Soyghurt Food Products Co. -- See under "Soya Products"

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Alpine Industries Ltd., 10-11, Yeshwant Niwas Rd., Indore. Tel : 537366.

Sakthi Soya, 180, Race Course Road, Coimbatore 641 018. Tel : 217 392, 214421, 214422. Tlx : 0855-333, Fax : 0422-217329.

Soyghurt Foods Products Co., Soyamilk Complex, Wardha Rd., Sitabuldi, Nagpur 440 012. Tel : (0712) 522645.

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Ranjit Liladhar Pvt. Ltd., 57/59, Kazi Sayed Street, 1st Floor, Bombay 400 003.

V.P. Bedekar & Sons Pvt. Ltd. -- See under "Pickles"

## SQUASHES

Anjana Foods, 50, M.M.T.C. Colony, Nanganallur, Madras 600 061.

Kalyan Products -- See under "Pickles"

Mangala Foods -- See under "Squashes"

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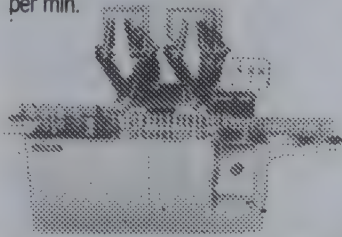
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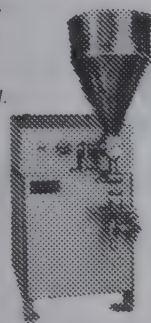
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## CREAM FILLER MODEL C.F.- 30

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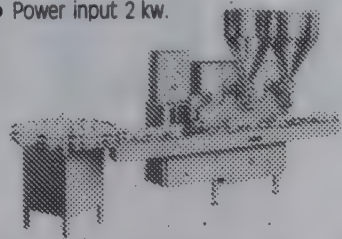
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- Power input 0.75 kw.



## AUTOMATIC CREAM FILLING MACHINE MODEL C.F.- 70

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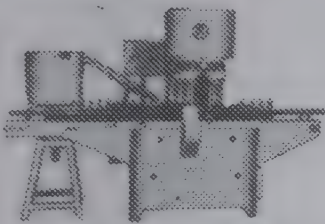
- Output upto 4500 containers/hr.
- Power input 2 kw.



## AUTOMATIC ROTARY CAPPING MACHINE MODEL A.C.- 6

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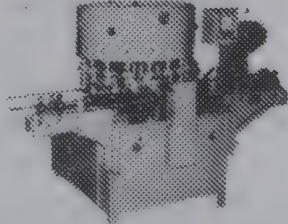
- Output upto 120 bottles/min



## AUTOMATIC ROTARY SEALING MACHINE MODEL R.S.- 16

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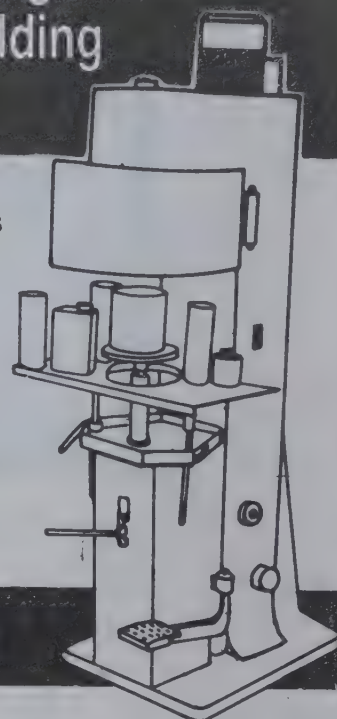
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021. Tel: 2028029/2028728/2870165, Fax: 2027980.

Thirumalai Chemicals Limited, Maalavika Centre, 5th Floor, 144, Kodambakkam High Road, Madras 600 034. Tel: 8255755. Tlx: 041-5415 TCL IN.

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Ganesh Benzoplast Ltd., Ganesh House, Marol, Andheri (E), Bombay 400 059. Tel: (91) (22) 8382096/8383097/8384548. Tlx: (081) 011-79164/83906 GNES IN. Fax: (91) (22) 2068475/

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Kiran Kotak & Co. -- See under "Gelatin"

Olin Chemicals -- See under "Acetic Acid".

Roha Dyechem Pvt Ltd. -- See under "Food Colours".

Sesu Trading Corporation -- See under "Acids".

Varun Industries -- See under "Food Processing Equipment/Plant"

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Safex Systems, 84/3, Bhandup Indl. Estate, Pannalal Compd., L.B.S. Marg, Bhandup (W), Bombay 400 078. Tel: 5641788, Fax: 91-22-5671223.

Unnati Corporation, 423-425, GIDC Tele. Exch. Lane, Odhav, Ahmedabad 382 415. Tel: 873434/872277. Tlx: 121-6816 ANAR IN.

Fax: 272-366505.

### AGAR AGAR (POWDER/STRIPS)

Amit Fine Chem, 14, 3rd Dharia House, Opp. Vinod Silk Mill, Ashok Chakravati Rd., Kandivli (E), Bombay 400 101. Tel: 6127988/8891730.

Caxton Phosphates & Agro Chemicals Pvt. Ltd. 32, Hansraj Karamshi Building, 70, Masjid Bunder Road, Bombay 400 003. Tel: 3750525/3753491.

Hi Media Laboratories Pvt. Ltd. -- See under "Culture Media"

Kiran Kotak & Co. -- See under "Gelatin"

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C.M. Equipment & Instruments (I) Pvt. Ltd., B-194, 5th Main, P.B. No. 5847, IInd Stage, Peenya, Bangalore 560 058. Tel: 8394361/8393711. Tlx: 0845/2066 (CMEI)

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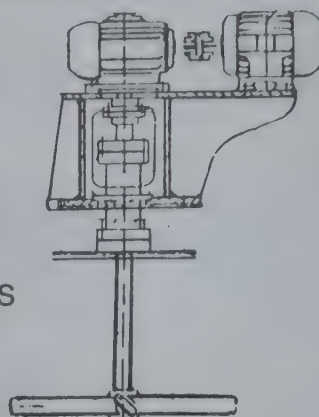
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Sesu Trading Corporation -- See under "Acids".

### ALGINATES

Burzin & Leons Agenturen Pvt. Ltd.-- See under "Additives, Food & Beverage"

### ANALYTICAL TESTING LABORATORY

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Quality Industries, W-50, MIDC, Phase II, Manpada Road, Dombivli 421 204 (E). Tel : 470431/473333. Fax : 470031.

Sesu Trading Corporation -- See under "Acids".

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Dewang Corporation, S-3 Navrang, Swastik Char Rasta, Navrangpura, Ahmedabad 380 009. Tel : (91-79) 656 8012, 380009. Tel: (91-79) 6568012, 464019. Fax : (91-79) 442 199, 462009.

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Harish C. Khosla & Co. -- See under "Essences & Flavours".

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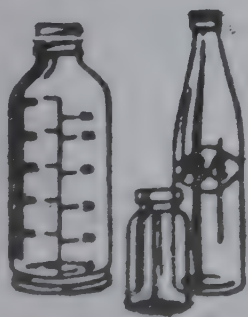
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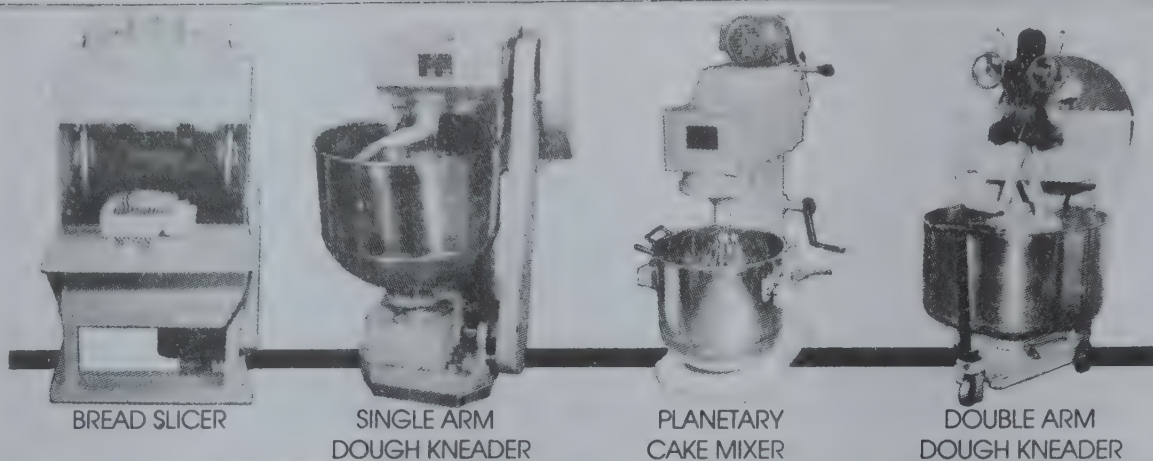
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12/13, Fax: 91-22-5164851.

Larsen & Toubro Ltd. -- See  
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### CAPSAROMAS

Harish C. Khosla & Co. -- See  
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Sayaji Sethness Ltd., 17/18



Ltd. -- See under "Aromatic Chemicals".

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C.M. Equipments & Instruments (I) Ltd. -- See under "Agitators"

Filtron India -- See under "Dairy Plant & Equipment".

Food Tech Engineers -- See under "Machinery, Food & Beverage Processing"

Frigmaires Engineers -- See under "Agitators".

Kalpna Boilers & Chemicals Plants Mfg. Co. -- See under "Boilers".

Magumps -- See under "Bottle Filling & Sealing Machines"

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The Panchal Workshop -- See under "Candy/Lolly Making Machine".

### CHEMICALS, FINE

Balaji Dye Chem -- See under

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Camlin Ltd. -- See under "Anti Oxidants".

Fine Organics -- See under "Emulsifiers, Food".

Hindustan Chemical Industries, 77-B, Juhu Supreme Shopping Centre, Gulmohr Rd., Juhu, Bombay 400 049. Tel: 620 5464/625 1836. Gr: BASICCHEM. Fax: 91-22-6204 121.

Hitashi Chemical, 11 Ezra St., Calcutta 700 001. Tel: 2479541/2471759/2254099/2253348. Fax: 033-2479738/407173.

P.D. Fine Chem, 158, Cubbonpet, P.D. Nair Road, Bangalore 560 002.

Piramal Healthcare Ltd., 28, Pt. M.M. Maliviya Rd., (Tardeo Rd.), Bombay 400 034. Tel: 91-22-5343508/509. Fax: 91-22-5346169

Sesu Trading Corporation -- See under "Acids".

Thirumalai Chemicals Limited -- See under "Acids".

### CHEMICAL PLANT & EQUIPMENT

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Cosywo Engineering Company, 15 Laxmi Co-op. Indl. Estate Ltd., Near Nagarvel Hanuman Mandir Amraiwadi Road., Ahmedabad 380 026. Tel: Fact: 2748168, 2748001. Gram: Cosywo. Fax: 079 274 8001.

Fabdecon Engineers -- See under "Agitators".

Fibre & Fibre Products -- See under "Agitators"

Frigmaires Engineers -- See under "Agitators"

Murarka Private Ltd., A/55, Capital Commercial Centre Bldg., Ashram Road, Ahmedabad 380 009.

Santosh Engineering & Fabricators -- See under "Boilers".

### CHEWING GUM MACHINERY

Bombay Industrial Engineers -- See under "Food Processing Equipment/Plant"

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Koooling System, 35 Mannar Reddy Street, T. Nagar, Madras 600 017. Tel: 044-4342220/4348633. Gr: RITEWAYS. Fax: 044-4343577.

MVS Engineering Ltd. -- See under "Air Dryers"

### CHOCOLATE MAKING MACHINES

Fabdecon Engineers -- See under "Agitators"

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Ace International -- See under "Guar Gum".

Alok Chem Corporation -- See under "Guar Gum".

Balaji Dye Chem -- See under "Additives, Food & Beverage".

Citurgia Biochemicals Ltd. -- See under "Acids".

Gipsicko Laboratories (P) Ltd., 37/41, Mahalaxmi Indl. Estate, Village Iyava, Ta. Sanand, Dist. Ahmedabad 382 110. Tel: (079) 2873537, 2113772. Fax: 91-079-5838408. Gr: GIPSICO.

Kiran Kotak & Co. -- See under "Gelatine"

Sesu Trading Corporation -- See under "Acids".

### CITRIC ACID/ ANHYDROUS

Amit Fine Chem.-- See under "Agar Agar (Powder/Strips)"

Olin Chemicals -- See under "Acetic Acid".

Sesu Trading Corporation -- See under "Acids".

### CITRONELLA OIL

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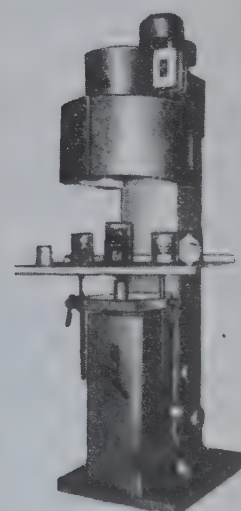
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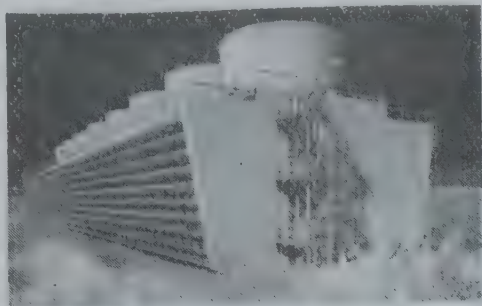


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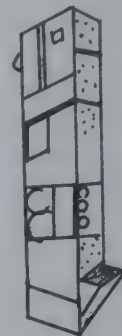
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Goma Engineering Pvt. Ltd. --  
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Tricon Food Machinery Co.--  
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Varun Industries -- See under  
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Street, Fort, Bombay 400 023. Tel:  
2657206/2651864.

Ducon Equipments Pvt. Ltd., 6  
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Bombay 400 026. Tel : 388-8294/  
532 2395/579-0271. Fax : 0091-  
22-5787929.

Synergy Agro-Tech (P) Ltd.--  
See under "Air - Conditioning/Re-  
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Fax: 2083184.

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al Containers Div., 249 Bal  
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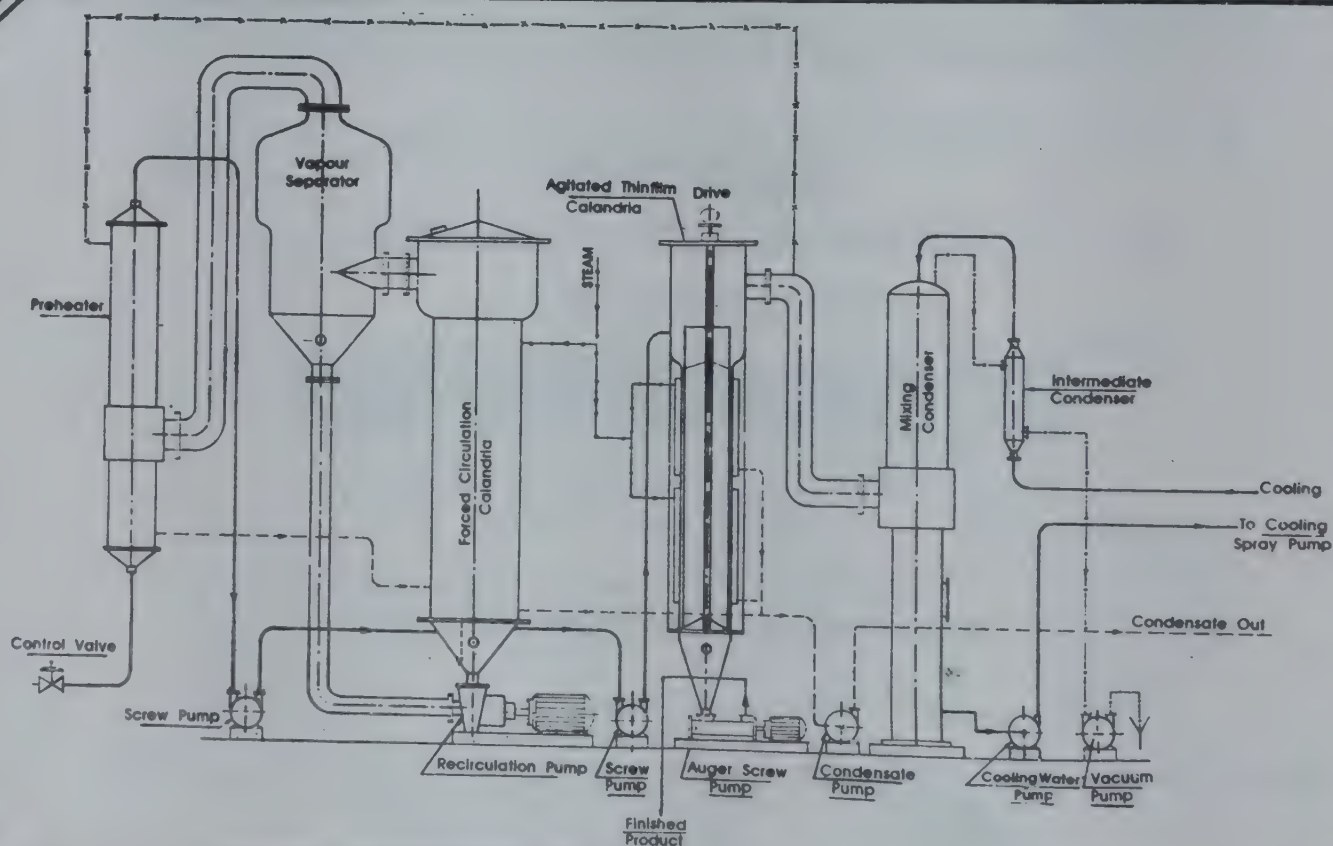
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Continental Equipment India Pvt. Ltd. -- See under "Bakery/Biscuit Equipment".

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Frigmaires Engineers -- See under "Agitators".

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'METACOLOR', Shree Precoated Steel Ltd. -- See under "Refrigeration Equipment &

Plant".

Saffaire India -- See under "Air Conditioning/Refrigeration Plant & Equipment".

Sangram Engineering Pvt. Ltd. -- See under "Turnkey Plant/Projects".

Synergy Agro - Tech. (P) Ltd. - See under "Air Conditioning/Refrigeration Plant/Equipment"

### DEFOAMERS

Fine Organics -- See under "Emulsifiers, Food"

### DEEP FAT FRYERS

Sri Rajalakshmi Commercial Kitchen Equipment P. Ltd., 57 (Upstairs) Silver Jubilee Park Rd., Bangalore 560 002. Tel : 2239738/2221054. Fax : 2222047.

### DEEP FREEZERS

C.M. Equipments Instruments (I) Pvt. Ltd. -- See under "Agitators"

Kooling Systems -- See under "Chilling Plants"

### DEHUMIDIFIERS

Arctic India Sales, 20, Rajpur Road, Delhi 110054. Tel: 2522424/231129. Tlx: 031-78003 AISL IN.

Kooling Systems -- See under "Chilling Plants"

### DEHYDRATED INGREDIENTS

Food Associates Bangalore, 132, 17th Cross, 11th Main Rd., Malleswaram, Bangalore 560 055. Tel : 080-3340038/3347318. Cable: FABFOODS. Tlx: 0845-2900 PCO IN. Fax : 91-80-3347318.

Hi Media Laboratories Pvt. Ltd. -- See under "Culture Media"

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### DEHYDRATION PLANT/EQUIPMENT

McNally Bangalore Industries Ltd., Post Box No. 28, Whitefield P.O., Bangalore 560 066. Tel : 845 2596. (8 lines) Fax : 080-845 2764; Gr: MINPROC - WHITEFIELD. Tlx : 0845-8513.

Orbit International Technologies Pvt. Ltd. -- See under "Machinery, Potato Processing"

### DEMINERALISER

Aqua Filsep Inc. -- See under "Water Treatment Plants/Equipment"

Komal Industries--See under "Water Treatment Plants/Equipment".

Water Testing Services -- See under "Water Treatment Plants/Equipment".

### DESTONERS

Durai Industrial Works, 1143, Mettupalayam Rd., Combatores 641 043. Tel : 442380. Fax : 91-22-442250

### DETECTION EQUIPMENT, Fire/Smoke, etc.

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Prabhadevi P.O. Prabhadevi,  
Bombay 400 025. Tel: 4224461.

#### DEXTROSE

Vertex Chemicals -- See under  
"Liquid Glucose"

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Grant Rd., Bombay 400 007. Tel:  
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Vipul Engineering Equipment  
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#### DISPENSERS, BEVERAGES

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449538. Fax: 91-79-443537.

Frigmaires Engineers -- See  
under "Agitators".

#### DISPLAY CABINETS, REFRIGERATED

Anand Refrigeration Co. Pvt.  
Ltd., D-86 Lajpat Nagar 1, New  
Delhi 110 024. Tel: 6842677. Fax:  
91-11-6822551.

General Air Conditioning Co. -  
- See under "Cold Storage Plants/  
Equipment"

#### DISPOSABLES, CUPS/ TRAYS, ETC.

Wonderpack Industries (P)  
Ltd., See under "Biscuit Packing  
Machinery"

#### DISTILLATION COLUMNS

Acme Synthetic Chemicals, 308  
Veer Savarkar Marg, Bombay 400  
028. Tel : 4465127/4452706.

#### DISTILLERY PLANTS

Kothari Fermentation and  
Biochem Ltd. -- See under "Yeast,  
Bakers"

#### DISTILLED WATER PLANT

C.M. Equipments & Instru-  
ments (I) Ltd. Ltd. -- See under  
"Agitators"

#### DOSA DISPENSING MACHINES

Indian Food Fermentations  
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Madras 600 035. Tel: 450685.  
Fax: 91-44-4340304.

#### DOSERS

Goma Engineering Pvt. Ltd., --

See under "Beverage Processing  
Machinery".

Micron -- See under "Water  
Sterilizers".

Water Testing Services -- See  
under "Water Treatment Plants/  
Equipment".

#### DOUGH KNEADER

Elma Industries, A/15 Aaram  
Society, Vakola, Santacruz (E),  
Bombay 400 055. Tel : 6183356.  
Gr : MANELSI.

I.M.B. Engineering -- See un-  
der "Bakery/Biscuit Equipment".

#### DRYERS, OVEN/ TRAY, ETC.

Bombay Industrial Engineers--  
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ment/Plant".

C.M. Equipments & Instru-  
ments (I) Ltd. Ltd. -- See under  
"Agitators"

Fabdecon Engineers -- See un-  
der "Agitators".

Food Tech Engineers-- See un-  
der "Machinery, Food & Beverage  
Processing"

Kailash Scientific Co., 28 Uni-  
versal Indl. Estate, I.B. Patel Rd.,  
Goregaon (E), Bombay 400 063.  
Tel: 8734735, 8731836.

McNally Bangalore Industries  
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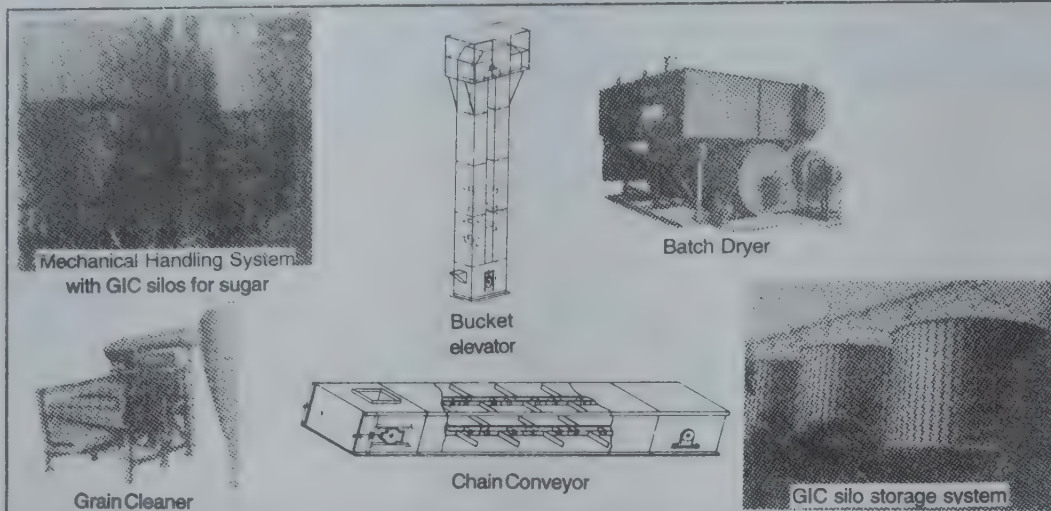
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Universal Food Flavours, 133 New Apollo Indl. Estate, Mogra Village Rd., Andheri (E), Bombay 400 069. Tel: 8322631. Fax: 8378156. Gr: JEBYPATEL.

### E. VANILLIN

Balaji Dye Chem -- See under "Additives, Food & Beverage".

### EFFLUENT TREATMENT PLANTS

Aqua Filsep Inc. -- See under "Water Treatment Plants/Equipment"

Chemi Filter Corporation -- See under "Agitators"

Gimret & Co., 403 Rohit House, Tolstoy Marg, New Delhi 110001. Tel: 3314422/3314499.

Fax: 91-11-3314377.

Ion Exchange (India) Ltd. -- See under "Water Treatment Plants/Equipment"

Paramount Consultants, Raja Market, 1st Fl., New Nagardas Rd., Andheri (E), Bombay 400 069. Tel: 838 3864/822 3835. (Resi) 841 2775. Pager No. (9602) 107 373.

Sharplex Agro Process (I) Pvt. Ltd. -- See under "Filters"

Shesha Scienti-Chem Pvt. Ltd., 4/1 Samartha Nagar, Chunabhatti Sion, Near Chunabhatti Rly, Station, Bombay 400 022. Tel: 5330821. Gr: SOFT-DION CHUNA-BHATTI SON.

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### EMULSIFIERS

Cosywo Engineering Co. -- See under "Chemical Plant & Equipment".

Frigmaires Engineers -- See under "Agitators".

Mamko Process Equipment Manufacturers, Post Box No. 19001, Bombay 400 063. Tel: 8886309/8889913. Gram: MIXIN Bombay 400 063. Fax: (91-22) 8822757.

Sesu Trading Corporation -- See under "Acids".

United Technologie -- See under "Conveyor".

### ENGINEERS & DESIGNERS, CONSULTING (See also under "Consultancy & Design")

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Forsberg Agritech (India) Pvt. Ltd., -- See under "Grain & Cereal Cleaning/Grading Machinery".

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Goma Engineering Pvt. Ltd. -- See under "Beverage Processing Machinery"

M.F. Marketing Pvt. Ltd. -- See under "Autoclaves".

### ENZYMES

Biocon India Pvt. Ltd., 20th Km Hosur Rd., Hebbagodi 561 229, Bangalore Dist. Tel: 080-8422169. Gram: BLASE, Bangalore 34.



Fax: 080-8422623.

Olin Chemicals -- See under "Acetic Acid".

### EPOXY COATING

Manikant Brothers -- See under "Anti-Corrosion Chemicals".

### ESSENCES & FLAVOURS

Beeta Chemicals, B/19, Nand Jyot Indl. Estate, Andheri Kurla Road, Bombay 400 072.

Bush Boake Allen (India) Ltd., 1-5, Seven Wells Street, St. Thomas Mount, Madras 600 016, Tel: 431131. Grams: ABROCOL-MADRAS. Tlx: 041 26058 BBA IN.

Essolla Enterprises, 355/7-8 GIDC Indl. Estate, Chitra: Bhavnagar 364 004, Gujarat. Tel: (0) 5892 (R) 21926.

Feroze Foods & Flavours, 403, Central Tin Est., F. Kondeo Marg, Sessex Road, Byculia, Bombay 400 027. Tel: 3729724/3640341.

Flavex Aromats (I) Ltd., 11, Sai Sadan, 43/4, Erandwane, Pune 410 004.

Gujarat Essence Mart Pvt. Ltd. -- See under "Colours, Food & Beverage"

Harish C. Khosla & Co., Zinat Mahal, Lalkuan, P.O. Box 1328, Delhi 110 006. Tel: 7524803/733160. Gr: THYMOL Tlx: 62267 HCK IN. Fax: 011-7524403

J. J. Jackson & Co. Post Box 27, Nanpura, Surat 395 001. Tel: 23365.

M.C. Davar Aromatics Pvt. Ltd., 266 B, J. Dadaji Marg, Hormazd Mansion III Floor, Opp. Bhatia Hospital, 266BJ, Dadajee Marg, Bombay 400 007, Tel: 3879468, 3865189. Tlx: (11) 73757 DAVR IN.

Oror Flavours & Chemicals Pvt. Ltd. -- See under "Food Flavours".

Red Club Flavours Pvt. Ltd., C-75, Kirti Nagar, New Delhi 110 015. Tel: 5451142, 5431556. Fax: 91-11-2913549. Gr: REDCLUB.

Sesu Trading Corporation -- See under "Acids".

Sonarome Chemicals Pvt. Ltd. -- See under "Aromatic Chemicals".

Universal Food Flavours -- See under "Dusting Flavours"

### ESSENTIAL OILS

Bhagat Impex Pvt. Ltd., 164 Sitaram Podar Marg, 1st Fl., Bombay 400 002. Tel: 2086928/2016995. Tlx: 011-80056 BGIL IN.

Gujarat Essence Mart Pvt. Ltd. -- See under "Colours, Food & Beverage"

Gupta & Company Ltd., XIV/294, Gali Mandi Pan, Sadar Bazar, Delhi 110006. Tel: 7774742/528923/527795. Tlx: 31-66075 GCPL-IN. Fax: 011-7519215 Cable: AROMA DELHI 110006.

Harish C. Khosla & Co. -- See under "Essences & Flavours"

Hitashi Chemicals -- See under "Fine Chemicals".

Jupiter Trading Company, 18 Devkaran Mansion's Chowk, 20 Mangaldas Rd., Bombay 400 002. Tel: 2054710, 8385129, 6145310.

Olin Chemicals -- See under "Acetic Acid".

Sesu Trading Corporation -- See under "Acids".

### ETHYL VANILLIN

Concorde Chemical Corp. -- See under "B H A".

Intel Corporation, 102 Kunal, 1st Rd., Opp. Madhu Park, Khar West, Bombay 400 052. Tel: 6460292/6483790, Fax: 022-646 3940.

### EVAPORATORS

Filtron Engineers Ltd. -- See under "Dairy Plant & Equipment"

SSP Pvt. Ltd., 19 DLF Indl. Area II, 13 Milestone, Mathura Rd., Faridabad 121003. Tel: 0129-275968/277442; Fax: (091)0129-277441/011-6847665; Tlx: 0343-286 SSP IN.

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North Star Ice Equipment Co. (I) Pvt. Ltd., 5 Krishna Kunj, 64/31 Erandwane, Pune 411 004. Tel: 340973, 348241. Fax: 0212-348241.

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Fabdecon Engineers -- See under "Agitators".

### FABRICATED EQUIPMENT

Cosywo Engineering Company -- See under "Chemical Plant & Equipment".

Fabdecon Engineers -- See under "Agitators"

Food Tech Engineers -- See under "Machinery, Food & Beverage Processing"

Frigmaires Engineers -- See under "Agitators"

Techno Equipment -- See under "Food Processing Equipment/Plant".

Vipul Engineering Equipment -- See under "Kitchen Equipment".

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Bombay Engineering Industry -- See under "Filling Machines, Powder/Granules"

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Bombay Engineering Industry, Rm. No. 6 (Extn). Sevantibai Bhavan, Chimatpada, Marol Naka, Andheri (E), Bombay 400 059. Tel: 8369368, 8215795. Fax: 91-22-8327448.

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Acmevac Sales Pvt. Ltd. -- See under "Bottle Washers & Rinsers".

Fabdecon Engineers -- See under "Agitators".

Food Tech Engineers -- See under "Machinery, Food & Beverage Processing".

Frigmaires Engineers -- See under "Agitators".

Mamko Process Equipment Manufacturers -- See under "Emulsifiers".

New Indo International (Regd.) -- See under "Pillowpack Packing Machines".

Recon Machine Tools Pvt. Ltd., 37 Sarvodaya Indl. Estate, Mahakali Caves Road, Andheri (E) Bombay 400 093. Tel : 8343931. Tlx : 911-79182 RMT. Fax : 8341074.

Samarpan Fabricators Limited, Plot A-182/A-183, Road 16/Z, Wagle Industrial Estate, Thane 400 604. Tel: 5321842/5320373/5320029. Grams: PROPAC. Tlx: 011-72329 SFL IN. Fax: 91-22-5320033.

Unique Flexo Packaging, Gala No. B/270, Joshi Wadi, Off Manpada Road, Dombivli (E), Bombay 421 201. Tel: 5785723

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Petrox Private Ltd. -- See under "BOPP Film"

Wonderpack Industrial (P) Ltd., -- See under "Biscuit Packing Machinery"

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Rotoflex Industries Ltd., 2nd Fl., Asarpota Chambers, C.G. Rd., Navrangpura, Ahmedabad 380 009. Tel: 461020, 423940, 406766. Fax: 91-79-463444.

## **FILTERS**

Food Tech Engineers -- See under "Machinery, Food & Beverage Processing"

Kumar Process Consultants & Chemicals Pvt. Ltd., 230/4 Ashoka House, 'Swastik' Behind Puranmal Delhiwala Linking Rd., Bandra (W), Bombay 400 050. Tel: 6432512/6420637/6451964. Tlx: 011-75973 KPCC IN. Fax : 091-22-6432512.

Otoklin, Plot No. 1, Shah. Indl. Area, V. Desai Rd., Andheri (W), Bombay 400 058. Tel: 6267476.

Sharplex Agro Process (I) Pvt. Ltd., 302 Hill View, Ind. Est., LBS Marg, Ghatkhopar (W), Bombay 400 086. Tel : 5172606, 5172108, 5173808. Fax : 91-22-517 1239.

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## **FILTER CLOTH/FABRIC**

Thor Systems -- See under "Air/Dust/Fume Control"

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Blinex -- See under "Air Filters"

Sharplex Agro Process (I) Pvt. Ltd. -- See under "Filters"

## **FILTRATION SYSTEMS**

Brito-matics, C-9 Nand Dham Indl. Estate, Marol Maroshi Rd., Marol, Andheri (E), Bombay 400 059. Tel : 8379833-8379834. Fax : 91-22-8375699.

Kumar Process Consultants &

Chemicals Pvt. Ltd. -- See under "Filters".

Paramount Consultants -- See under "Effluent Treatment Plants"

Pharmaco Machines -- See under "Bottle Washers & Rinsers"

## **FISH PROCESSING PLANT**

Industrial Refrigeration -- See under "IQF Spiral Freezing"

Sharplex Agro Process (I) Pvt. Ltd. -- See under "Filters"

## **FLAKING MACHINERY, RICE**

Durai Industrial Works -- See under "De-Stoners"

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M.C. Davar Aromatics Ltd. -- See under "Essences & Flavours"

## **FLAVOURING EMULSIONS**

M.C. Davar Aromatics Pvt. Ltd. -- See under "Essences & Flavours".

Sri Krupa Flavours Pvt. Ltd., APHB, HIG II, Block 6, Flat 7, Bagh Lingampally, Hyderabad 500 044. Tel: 669038. Gr: SRI KRUPA.

## **FLAVOURING ESSENCES**

Feroze Foods & Flavours, 403 Central Tin Estate, D.K. Marg, Sussex Road, Byculla, Bombay 400 027. Tel: 3729724, 3614972.

M.C. Davar Aromatics Pvt. Ltd. -- See under "Essences & Flavours".

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Flex Industries Ltd., 119 Damji Shamji Udyog Bhavan, Veera Desai Rd., Andheri (W), Bombay 400 053.

## **FLOUR MILL MACHINERY**

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Sri Rajalakshmi Commercial Kitchen Equipment P. Ltd. -- See under "Deep Fat Fryers"

## **FLOW VALVES**

Ducon Equipments Private Ltd.

-- See under "Conveyor Systems"

## **FLOW METER**

Fisher-Rosemount (India) Ltd., 26 Maker Chambers VI, 2nd Fl., Nariman Pt., Bombay 400 021. Tel : (022) 2874 758/89, 2851066, 2851774, 2851734, Tlx : 011-83757 JSGR IN, Fax : (022) - 2870502.

## **FLUID BED DRYERS**

Flora Engineering Co. -- See under "Ovens, Industrial".

Pharmaco Machines, Ground Fl., Pandit House, Behind Nagrik Stores, Station Road, Thane 400 601. Tel: 5332245/5463722. Fax: 91-22-5331084.

## **FLUID PROCESS APPLICATION**

Alweyn Pumps & Systems Pvt. Ltd., 62 Apollo Indl. Estate, Opp Mahakali Caves Rd., Andheri (E). Tel/Fax (022) 836 2688/821 4026/Gr: Alweyn Fam Bombay 59

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Opel Industries, 235-A, Adyar Industrial Estate, Sun Mill Compound, Lower Parel, Bombay 400 013. Tel: 4924123, 4926884, 4824123, 4926884. Fax: (022) 4926884.

Pest Control (I) Ltd. -- See under "Anti Pollution Control"

## **FOOD COLOURS**

See also "Colours, Food & Beverage"

Ajanta Products Company, 45 West Ave., Punjabi Bagh, New Delhi 110026. Tel : 503280, 5437299. Gram : Ajanta Dyes. Fax : 011-5115171.

Gujarat Essence Mart Pvt. Ltd. -- See under "Food Flavours".

Gujarat Foodweb Pvt. Ltd., Near Kalupukar Tower, Ahmedabad 380 001. Tel : (079) 380 225/336 595. Fax : (079) 469 109.

Hickson & Dadajee Limited, Shree Pant Bhuvan, Mamasahab Warerkar Bridge, Bombay 400 007. Tel: 3633968/3634760 Tlx: 11-75384 EHD IN Gram: SULF BLACK, Bombay. Fax: 91-22-3640604.

L.B. Aroma & Chemicals -- See under "Essential Oils".

Narmada Food Colours Pvt. Ltd., 56/58 Garibdas Street, Vadgadi, Bombay 400 003. Tel : 3424162/63. Fax : 91-22-3432854.

Roha Dychem Pvt. Ltd.,



Suryoday Mill Compound, Bombay 400 034. Tel: 91-22-4945924, 4920855, 4939006. Tlx: 011-71513 ROHA IN. Fax: 91-022-4939795, 4952631.

Sesu Trading Corporation -- See under "Acids"

Vino Synth Chem Pvt. Ltd., 404 Bezzola Commercial Centre, Sion Trombay Road, Chembur Bombay 400 071. tel: 5522359/5528958. Cable: VINOBIN. Fax: 5522539.

#### FOOD CUTTING EQUIPMENT

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#### FOOD DECORATIVES

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#### FOOD FLAVOURS

Aromatik (India), No. 28/46, 3rd Cross, Kumarapark West Extn. Bangalore 560 020.

Gujarat Essence Mart Pvt. Ltd., 124/126 Keshar Baug, Shamaldas Gandhi Marg, (Princess St.), Bombay 400 002. Tel: 2017214, 2011449. Gram: "ROSELEMON"

Oror Flavours & Chemicals Pvt. Ltd., Subbiah Naidu Industrial Complex, Arumbanoor Post, 4 Pudupatti, Madurai North 625 107. Tel: 0452-832736. Tlx: 0445-310 SSPIN Fax: 91-452-832824. Gram: SPICES.

Universal Food Flavours -- See under "Dusting Flavours"

#### FOOD PROCESSING EQUIPMENT/PLANT

See also "Machinery, Food & Beverage Processing"

Bajaj Maschnine (P) Ltd., 21 Kanti Nagar, P.O. Krishan Nagar, Delhi 110 051. Tel: 2220828, 2431660. Fax: 91-11-8954995.

BEC Foods, 31 Maker Chambers III, 3rd Flr., Nariman Pt., Bombay 400 021. Tel 2043647, 2831724, 2871331, Tlx : 011-84054 BECO IN, Fax : 022-2873611.

Cantech Machines -- See under "Can Closing & Seaming Machine".

Continental Equipment India Pvt. Ltd. -- See under "Bakery/Biscuit Equipment".

Durai Industrial Works -- See

under "De-Stoners"

Fabdecon Engineers -- See under "Agitators".

Filtron Engineers Ltd. -- See under "Dairy Plant & Equipment"

Food Tech Engineers -- See under "Machinery, Food & Beverage Processing"

Geeta Food Engineering, Ashirwad Complex, Vashi Village, Opp. Starling Hospital, Gala No. 2, New Bombay 400 703. Tel: 022-

7667069, 7662098. Fax: 91-22-7662098.

Goma Engineering Pvt. Ltd.-- See under "Beverage Processing Machinery"

Hi-Tech Systems, 80, Hardwar Road, Dehradun 248 005. Delhi Office: C-9B, Gangotri Enclave, Alakhnanda, Kalkaji, New Delhi 110 019, H.O. 25853 D.O. : 6436772. Gr: ATMA.

Industrial Refrigeration -- See under "IQF Spiral Freezer".

New Indo International -- See under "Pillow Pack Packing Machines".

M.F. Marketing, B-104 Arjun Centre, B.S. Devshi Marg, Govandi 400 088. Tel : 5560947/5557515. Gr: STEAMSET. Fax : 91-22-5560569.

Metal Plants -- See under "Contra-Rotary Mixers".

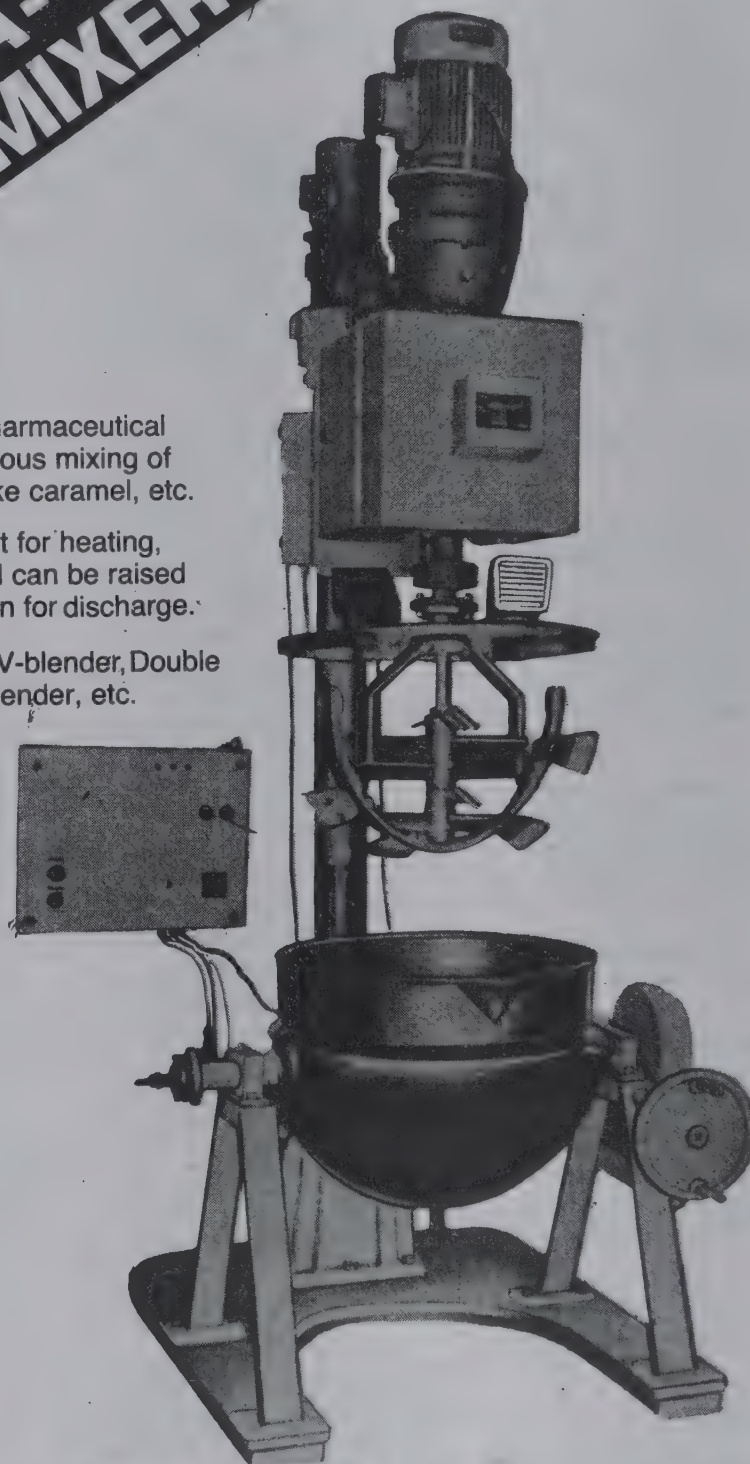
'METACOLOR', Shree Precoated Steel Ltd.-- See under "Refrigeration Equipment &

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Plant".

S.J. Roy, B-59 Defence Colony, New Delhi 110 024. Tel: (011) 4694689, 4623224. Fax: (011) 4623224.

Sangram Engineering Pvt. Ltd. -- See under "Turnkey Plants / Projects".

Santosh Engineering & Fabricators -- See under "Boilers".

Techno Equipments, Saraswati Sadan, 31 Parekh St., Bombay 400 004. Tel: 3851258, 5515640. Gram: FOODEQUIP, Bombay 4.

Tricon Food Machinery Co., 5A Mayur, Off Bhayandar Rd., 771 Deccan Gymkhana, Pune 411 004. Tel: (0212) 342203, 344607, 342451. Fax: (0212) 342451.

Vamp Engineers Pvt. Ltd., 203 Rajguru Apts., New Nagardas Rd., Andheri (E). Bombay 400 069. Tel: 8380548/8384173. Fax : 91-22-8390195.

Varun Industries, Opp. Portuguese Church (W), Bombay 400 028. Tel: 4304850/4229400. Fax: 022-4362283.

#### **FORM-FILL-SEAL MACHINES**

Autopack Machines Pvt. Ltd. - See under "Bottle Filling & Sealing Machines"

Gansons Engineers Pvt. Ltd., 118/121 Swastik Chambers, Off. Sion Trombay Rd., Chembur, Bombay 400 071. Tel: 524548/524967.

Grip Engineers, 7/8, Meghwadi Naka, Opp. Maratha Mandir Co-op. Bank, Megh Wadi, Jogeshwari (East) Bombay 400 060. Tel : 645 5103/6455079.

New Indo International (Regd.) -- See under "Pillow Pack Packing Machines".

Rajhans Enterprise, No. 101 Sai Deep Shopping Centre, Chembur Govandi Rd., Opp. Vaishali Hotel, Chembur (West), Bombay 400 071. Tel: 5557574. Fax: 5160769.

Samarpan Fabricators Ltd. -- See under "Filling & Sealing Machines".

Unique Flexo Packaging-- See under "Filling & Sealing Machines"

#### **FREEZERS**

C.M. Equipments & Instruments (I) Pvt. Ltd. See under "Agitators"

Consolidated Services -- See under "Kitchen Equipment".

General Air Conditioning Co. -

- See under "Cold Storage Plant/ Equipment"

Industrial Refrigeration -- See under "IQF Spiral Freezers"

#### **FRIERS, FOOD**

Ross Thermal Systems Pvt. Ltd. -- See under "Steam Boilers"

#### **FRUIT CRUSHER**

Techno Equipments -- See under "Food Processing Equipment/ Plants".

#### **FRUIT JUICE BOTTLING PLANT**

Sangram Engineering Pvt. Ltd. -- See under "Turnkey Plants/ Projects."

#### **FRUIT VEGETABLE PROCESSING PLANT/ MACHINERY**

Eastend Engineering Co., 173/ 1 Gopal Lal Thakur Rd., Calcutta 700 035. Tel: 526324, 523416.

Goma Engineering Pvt. Ltd. -- See under "Beverage Processing Machinery"

Industrial Refrigeration -- See under "IQF Spiral Freezers"

Magumps -- See under "Bottle Filling & Sealing Machines"

Orbit International Technologies Pvt. Ltd. -- See under "Machinery, Potato Processing"

SSP Pvt. Ltd., 13 Mile Stone, Faridabad 121 003. Tel : 0129-277442/275968/277730. Fax : 0129-277441/011-6847665.

Sangram Engineering Pvt. Ltd. -- See under "Turnkey Plants/ Projects"

Synergy Agro-tech (P) Ltd. -- See under "Airconditioning/Refrigeration Plant/Equipment"

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Amit Fine Chem -- See under "Agar Agar (Powder/Strips)"

Olin Chemicals -- See under "Acetic Acids".

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0212-327209.

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MVS Engineers Co. -- See under "Air Dryers"

#### **GELATINE**

Amit Fine Chem -- See under "Agar Agar (Powder/Strips)".

Kiran Kotak & Co., 414/418 M.J. Phule Market (Crawford Market), Bombay 400 001. Tel : 3429580, 3442796. Fax : 3429580.

Sesu Trading Corp. - See under "Acids"

#### **GHEE FILTRATION UNITS**

Codex Enterprises -- See under "Batch Coder".

#### **GLASS & GLASSWARES**

R.G. Glass Agency -- See under "Bottles & Jars, Glass".

#### **GLASS FABRICS, PTFE COATED**

Unnati Corporation -- See under "Adhesive Tapes, PTFE, Glass".

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Amruth Starch Private Ltd., Morampudi Post, Hukempeta, Rajahmundry 533103. Tel : 61106.

The Sukhjit Starch & Chemicals Ltd. -- See under "Starch"

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Shirke Structurals Pvt. Ltd. -- See under "Silo Storage Systems"

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Goldin (India) Equipment Pvt. Ltd. -- See under "Grains & Cereals Cleaning/Grading Machinery"

John Fowler (India) Limited, Sarjapur Road, Bangalore 560 034.

Tel: 5530026. Fax: 91-08-5533228. Tlx: 08452545.

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Sesa Pulverisers, Kala Kila Road, Dharavi, Bombay 400 017. Tel: 4121434.

#### **GRINDING MILLS**

Frigmaires Engineers -- See under "Agitators".

Sesa Pulverisers -- See under "Grinder, Wet & Dry".

#### **GUAR GUM**

Ace International, 13/21, Laura Bldg., 1st Floor, Office No. 5B, 1st Dhobi Talao Lane, Bombay 400 002. Tel: (O) 2001413/2008169. Fax: 91-22-2093240. Tlx: 011-86654 PCOK IN.

Alok Chem Corporation, 406, Goradia House, P.O. Box No. 13048, 100/104, Kazi Syed Street, Bombay 400 003. Tel: 3426390/5365. Res: 5648355. Fax: 91-22-3426390.

Indian Gum Industries Ltd., 15-A, Maker Chamber IV, Nariman Pt., Bombay 400 021. Tel : (022) 2852075, 76, 77. Fax : 0091-22-2040393. Tlx: (011) 82139 IGUM, 83248 IGIL

Kapadia Gumchem Industries, 3, Mint Road, 2nd Floor, Room No. 30, Opp. G.P.O. Box No. 1160, Bombay 400 001. Tel: 2615073/2617217. Gram: PHARMAGUM. Fax: 91-22-2619423. Tlx: 011-86630 KGI IN

Swastik Gum Industries (India) 328 G.V.M.M. Vasahat, Odhav, Ahmedabad 382415. Tel: 870063/870064/870065. Tlx: 011-73265 KATR IN (Bombay).

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Indian Gum Industries Ltd. -- See under "Guar Gum"

Kapadia Gumchem Industries- See under "Guar Gum".

Shree Ram Gum & Chemicals, C-79 MIA, II Phase, Basni, Jodhpur 342 005.

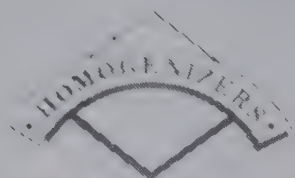
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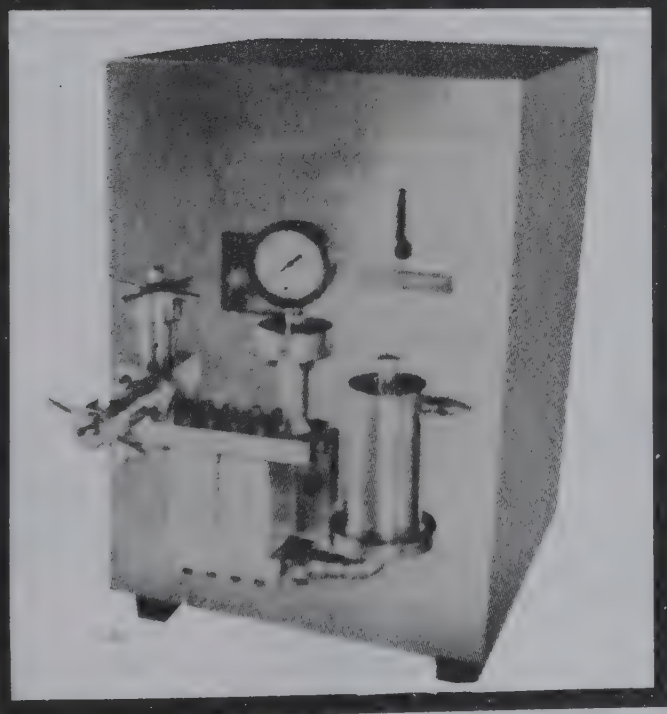




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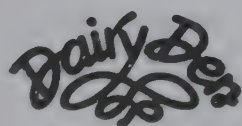
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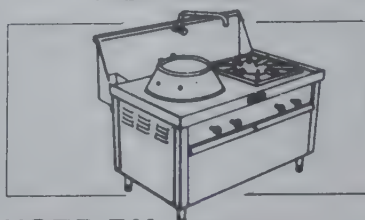
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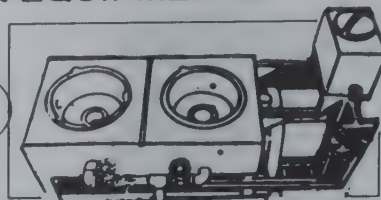
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Bataji Dye Chem -- See under "Additives, Food & Beverage".

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Kapadia Gumchem Industries, -- See under "Guar Gum".

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## GUM GHATTI

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Alok Chem Corporation -- See under "Guar Gum".

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Great Blends, 5/1 Fourth Main Rd., Jayanagar Extn., Mysore 570014. Tel : 080-26990.

IDL Arom International Ltd., Nirmal, 15th fl., Nariman Pt., Bombay 400 021. Tel: (91) 22-2026946/2025318/2041267, Fax: (91) 22-2041187, Tlx: 011-82539 IDLB IN.

Indian Gum Industries Ltd. -- See under "Guar Gum"

Kapadia Gumchem Industries - See under "Guar Gum".

Olin Chemicals -- See under "Acetic Acid".

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Food Tech Engineers -- See under "Machinery, Food & Beverage Processing".

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## HEATING MANTLES

Lab Instruments, Ratnadeep, 1st Floor, 78, B. Jaganath Shankar Seth Rd., Behind Panchratna, Near Roxy, Opera House, Bombay 400 004. Tel: 3610973. Fax: 3634619.

Manikant Bros. -- See under "Anti-Corrosion Chemicals".

Subhash Gupta & Co. -- See under "Heating Elements".

Thermal Instruments & Equipments -- See under "Dairy Laboratory Equipments".

## HOMOGENIZERS

Cosywo Engineering Co. -- See under "Chemical Plant & Equipment"

Dairy Den (India) Pvt. Ltd., 25 Madhuvan, Ellisbridge, Ahmedabad 380 006. Tel : 461205/449538. Fax : 079-443537. Tlx : 0121-7157 DDPL IN.

Dairymac Engineering Pvt. Ltd. -- See under "Dispensers, Beverages"

Fibre & Fibre Products -- See under "Stirrers"

Filtron Engineers Ltd. -- See under "Dairy Plant & Equipment"

Frigmaires Engineers -- See under "Agitators".

Goma Engineering Pvt. Ltd. -- See under "Beverage Processing Machinery"

Indrayani Agro Industries Pvt. Ltd., D-56 MIDC Additional Industrial Estate, Ambad, Nasik 422010. Tel : 382483. Fax : 381267.

J. T. Jagtiani -- See under "Machinery, Food & Beverage Processing".

Mamko Process Equipment Manufacturers -- See under "Emulsifiers".

Synergy Agro-tech (P) Ltd. -- See under "Airconditioning/Refrigeration Plant/Equipment"

## HOT WATER GENERATORS

Ross Thermal Systems Pvt. Ltd. -- See under "Steam Boilers"

## HUMIDIFIERS

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C.M. Equipments & Instruments (I) Pvt. Ltd. -- See under "Agitators"

## HYDROL

Dewang Corporation -- See under "Aromatic Chemicals".

## HYDRO EXTRACTORS

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## HYDROMETERS

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## HYGROMETERS

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Multifrig Marketing Co. (P)



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Karna Industries Ltd., 10/67 Industrial Area, Kirti Nagar, New Delhi 110 015. Tel: 530650, 530700. Fax: 91-11-5437960. Tlx: 031-668 65.

Snowball Enterprises, Shop No. 44, Panchratna, Gr. Fl., Opera House, Bombay 400 004. Tel: 3640335. Fax: 91-22-3614863.

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### ICE CREAM MAKING MACHINES

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Synergy Agro - tech (P) Ltd. -- See under "Air conditioning/Refrigeration Plant/Equipment"

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### IMPROVERS

Davars M.P. Organics -- See under "Emulsifiers, Food".

### IMPULSE SEALERS

N.S. International, 18 Venus Apt., Navghar Road, Bhayander (E), Bombay 401105. Tel: 8193005.

Sarlech Electro Systems, 14462/1 Bhagwan Nagar, Near Savitri, Complex, G.T. Rd., Ludhiana 141003. Tel: 531444; Gram: SARLEHEAT. Tlx: 0386-384 PSIC-IN-ATTN. Fax: 091-

161-532871.

Swastik Packaging, 4 Dev Sadan, Chimatpada, Behind Hotel Ruby, Marol Naka, Andheri (E), Bombay 400 059. Tel: 8324673, 8341340. Fax: 91-22-8388198.

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Pest Control (India) Ltd., 127 Keytuo Ind. Est., 220 Kondivta Rd., Andheri (E), Bombay 400 059. Tel: 8217385/8213546. Fax: 822 1647.

Varun Industries, Opp. Portuguese Church, Dadar (West), Bombay 400 028. Tel: 4304850. Fax: 4362283

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LBS Marg, Bhandup (W), Bombay  
400 078. Tel: 5647055, 5641599.  
Fax: 5649890.

**JUICE EXTRACTOR**

Food Tech Engineers -- See  
under "Machinery, Food & Beverage  
Processing".

Geeta Food Engineering -- See  
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Plant".

Techno Equipments -- See under  
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Plant".

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JACKETTED)**

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Jacketted Kettles"

Continental Equipment India

Pvt. Ltd. -- See under "Bakery/Bis-  
cuit Equipment".

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"Machinery, Food & Beverage  
Processing".

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ment/Plant".

Techno Equipments -- See under  
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Plant".

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Tel : 6112521. Gr : INDOSALE.  
Fax : 91-11-679154.

Continental Equipment India  
Pvt. Ltd. -- See under "Bakery/Bis-  
cuit Equipment".

Essee Kitchenaid, "Shreeniwas  
House", 98 Dattaram Lad Marg,  
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4136393, 4135982. Cable:  
KITCHENTOP. Tlx: 011-3920.  
Fax: 3780960.

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"Agitators".

Jaico Metals, Mathumadas Mill

Comp., Lower Parel, Bombay 400  
013. Tel : 4923259. Fax :  
4943409.

Kitchen Udyog, 112 Reshab  
Shree House, Commercial Com-  
plex, New Delhi 110008. Tel: 570  
3616.

New Canara General Stores,  
178 Dr. Babasaheb Ambedkar Rd.,  
Byculla, Bombay 400 027. Tel :  
3722031.

Rite Equipments Pvt. Ltd., G-  
36, 2nd Flr., Green Park Main,  
New Delhi 110 016. Tel: 6960862.  
Fax : 91-11-6850459.

Sri Rajalakshmi Commercial  
Kitchen Equipment Pvt. Ltd. -- See  
under "Deep Fat Fryers"

Vipul Engineering Equipment,  
13th Girish Kunj, Rd., No. 3, Juhu  
Scheme. Vile Parle (W), Bombay  
400 056. Tel: 6145100, 8080692.  
Fax: 022-4943409.

**KITCHEN FOIL**

Foil Impex (Bombay) Pvt. Ltd.,  
66 Bharat Mahal, 86 Marine Drive,  
Bombay 400 002. Tel : 91-22-  
2017202/2011401. Fax : 91-22-  
4950467.

**KNEADERS**

Fabdecon Engineers -- See under  
"Agitators".

Frigmaires Engineers -- See under  
"Agitators".

Vipul Engineering Equipment  
-- See under "Kitchen Equipment".

**LPG BOTTLING PLANT**

Globe Gas Equipments Indus-  
try Pvt. Ltd. -- See under "Burn-  
ers/Fittings, Commercial"

**LABELLING MACHINES**

Bhavani Pattern Works, Plot  
No. 2, Phase II, GIDC, Vatva,  
Ahmedabad 382445. Tel :  
5831346. Fax: 079-5835885.

Excel-Techno Engineers Pri-  
vate Ltd., 27 Stadium House,  
Navrangpura, Ahmedabad 380  
009. Tel: 079-6427866. Fax : 079-  
6427866.

Lab Instruments -- See under  
"Heating Mantles".

Maharshi Udyog, 4 Ruchi, 36  
Swastik Society, Navrangpura,  
Ahmedabad 380 099. Tel: 409183/  
452456. Fax: 0272-425456.

Wonderpack Industries (P) Ltd.  
-- See under "Biscuit Packing Ma-  
chinery"

**LABEL GUMMING  
MACHINE**

Pharma Machines -- See under

"Bottle Washers & Rinsers"

**LABEL PRINTING  
MACHINE**

Codex Enterprises -- See under  
"Batch Coder".

Gopal Engineering Works, Part  
2/5 Kailash Ind. Estate, Behind  
C.M.C. Odhav, Ahmedabad 382  
415. Tel : (079) 2874969.

Jacsons Engineers, Phase 4,  
Plot No. 4701, G.I.D.C. Ind. Es-  
tate, Vatva, Ahmedabad 382 445.  
Tel: 830156. Gram : JALDEEP.  
Fax: 91-079-833408.

**LABORATORY  
EQUIPMENT**

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ments (I) Pvt. Ltd. -- See under  
"Agitators"

Lab Instruments -- See under  
"Heating Mantles".

**LABORATORY,  
TESTING**

Bangalore Test House, 65, 20th  
Main, Marenhalli, Vijaynagar,  
Bangalore 560 040. Tel: 3356415,  
Gram: TEST HOUSE.

**LACTIC ACID**

Balaji Dye Chem -- See under  
"Additives, Food & Beverage".

Indus Chemie, 174 Samrat  
Bhavan, Rm. No. 3, Gujarat Soci-  
ety, Sion (W), Bombay 400 022.  
Tel : 4071318/4071346. Fax : 022-  
4092718.

Lactochem Ltd., 18 Venu  
Reddy St., Guindy, Madras 600  
032. Tel: 044-234-789. Gr:  
LACTOCHEM. Fax: 044-  
2343857.

Sesu Trading Corp -- See under  
"Acids".

**LAMINATED  
PACKAGING FILM**

Samarpan Converters Ltd. --  
Plot No. -182/A-183, Rd. 16/2,  
Wagle Indl. Estate, Thane 400 604.  
Tel: 5321842, 5320822, 5320029.  
Fax: 91-22-532033.

**LEADER LINE  
CONTROLLER**

Tata Honeywell, 55-A/8, 9  
Hadapsar Indl. Est., Pune 411 013.  
Tel : 670445, 675532. Fax: 212-  
675992/672205.

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Aroma Impex -- See under "Ar-  
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Hitashi Chemical -- See under  
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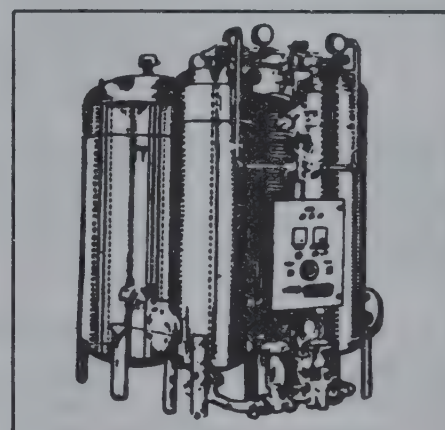


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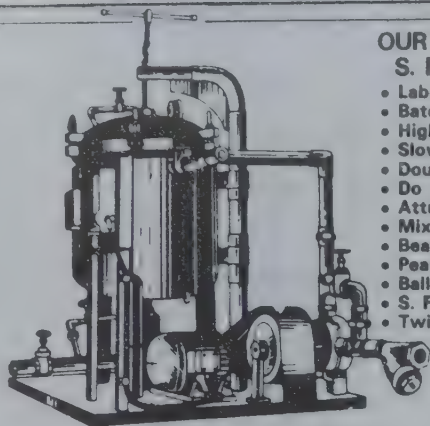
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Hitashi Chemicals -- See under "Aromatic Chemicals".

Olin Chemicals -- See under "Acetic Acid".

Southern Citrus Products (Private) Ltd. -- See under "Pectin".

Vidarbha Fruit Products Co. Pvt. Ltd. -- See under "Calcium Citrate"

**LIPIDS, FOOD**

Vidarbha Fruit Products Co. Pvt. Ltd. -- See under "Calcium Citrate"

**LIQUID GLUCOSE**

Vertex Chemicals, 301-B, Heritage House, Gundavli Cross Rd., No. 2, Andheri East, Bombay 400 069. Tel/Fax: 8218004.

**LIQUOR FLAVOURS**

Oror Flavours & Chemicals Pvt. Ltd. -- See under "Food Flavours".

**LUBRICANTS**

Acme Synthetic Chemicals -- See under "Distillation Columns"

**LUG CAPS**

Larsen & Toubro Ltd., (Packaging Div.)-- See under "Bottle Caps & Closures"

**LUG CAP SEALING MACHINE**

Raj Products & Equipment, P.O. Box 8075, Bombay 400 056. Tel: 8192250, 8192750. Res: 6102035, Fax: 8375628.

**MACHINERY, BLISTER PACKAGING**

Sarlech Electro Systems -- See under "Impulse Sealers"

Samarpan Fabricators Ltd. -- See under "Filling & Sealing Machinery"

**MACHINERY, BREAD/BISCUIT**

Prima Engg. Industries -- See under "Bakery /Biscuit Equipment"

**MACHINERY, CONFECTIONERY**

Continental Equipment India

Pvt. Ltd. -- See under "Bakery/Biscuit Equipment".

Fabdecon Engineers -- See under "Agitators".

Frigmaires Engineers -- See under "Agitators".

**MACHINERY, DAIRY PROCESSING**

See also under "Dairy Plant & Equipment"

Fabdecon Engineers -- See under "Agitators".

**MACHINERY, FOOD & BEVERAGE PROCESSING**

See also "Food Processing Machinery/Equipment".

Bombay Industrial Engineers, 430 Hind Rajasthan Centre, D.S. Phalke Rd., Dadar (C. Rly.), Bombay 400 014. Tel : 411 3999/ 4114275. Gr: BOMBING, Bombay 14.

Chengalva Engineering Pvt. Ltd. -- See under "Dairy Plant & Equipment"

Consolidated Services -- See under "Kitchen Equipment"

Ducon Equipments Private Ltd. -- See under "Consultancy & Design"

Food Tech Engineers, 31A, Ghanshyam Ind. Estate, Veera Desai Road, Andheri (West), Bombay 400 058. Tel: 6269106, 6234718. Fax: 91-22-6267298/ 6269106.

J.T. Jagtiani, National House, Tulloch Road, Apollo Bunder, Bombay 400 039. Tel: 2020028/ 2021433.

Sangram Engineering Ltd., B-5 Supercon, Opp. ITI, Aundh, Pune 411007. Tel : 366935, 342302. Fax : 349673.

Vamp Engineers Pvt. Ltd., 203 Rajguru Apts., New Nagardas Rd., Andheri (E), Bombay 400 069. Tel : 91-22-8390195.

**MACHINERY, LABELLING**

Excel Techno Engineers Private Ltd., 27 Stadium House, Navrangpura, Ahmedabad 380 009. Tel: 079-6427866, Fax: 079-6427886.

**MACHINERY, MEAT PROCESSING**

Food Tech Engineers -- See under "Machinery, Food & Beverage Processing"

Orbit International Technologies Pvt. Ltd. -- See under "Machinery, Potato Processing"

**MACHINERY, PACKAGING**

A.M.P. Rose (P) Ltd., 38 Double Road, K.H. Rd., Bangalore 560 027. Tel : +91 (0) 2226227, 2216514. Fax : 91-(0) 80-2216165.

Aarkay Wrapping Machines Pvt. Ltd., 1, Hormuzd, 131, August Kranti Marg, Bombay 400 036. Tel: 3670537, 367-5277. Fax : 91-22-3670217. Gram: CRAFTWORLD.

Autopack Machines Pvt. Ltd. -- See under "Bottle Filling & Sealing Machines"

Frigmaires Engineers -- See under "Agitators".

Indec Equipment Pvt. Ltd -- See under "Can/Bottle Cartoners".

Kavacha Engineering, 33, E.C. Extn., Kushaiguda, Hyderabad 500 762. Tel: 623665/863995. Fax: 620892.

New Indo International (Regd.) -- See under "Pillowpack Packing Machine"

Noble Polymech Corporation, W-102 MIDC, Phase 2, Dombivli 421204, Bombay 421204. Tel : (0251) 470453. Fax : (0251) 470453.

Pakona Engineers (India) Pvt. Ltd., 22-D, Wadia Charities Bldg., 2nd Floor, S.A. Brelvi Street, Fort, Bombay 400 023. Tel: 2872181/ 2874642.

Production Engg. Consultants -- See under "Pillow Pack Machines".

R.G.K. Enterprises, Madhu Kunj, Vinod Baug, Juhu-Line, Block No. 12, Ground Floor, Andheri (W), Bombay 400 058.

Rathi Industrial Equipment Co. Ltd. -- See under "Size Reduction Equipment"

Recon Machine Tools Pvt. Ltd., 37 Sarvoday Indl. Estate, Mahakali Caves Rd., Andheri (E), Bombay 400 093. Tel: 834973, 8343913. Fax : 022-8361074.

Sarlech Electro Systems -- See under "Impulse Sealers"

Samarpan Fabricators Ltd. -- See under "Filling & Sealing Machinery"

Selall -- See under "Filling Machinery, Bag/Pouch"

Shree Ancillary Industries -- See under "Pillow Pack Packing Machines"

Sil & Pack Industries, 30 Laxmi Ind. Estate, New Link Rd., Andheri (W), Bombay 400 058. Tel : (022) 6266535, 6266943. Fax : 91-22-6266535.



Stela Impex, C-9 Sector 2,  
Noida 201 301. Tel: 011-8927971.  
Fax: 011-23104.

St. Joseph Engg. Works, 216/  
304 - A Manish Commercial Centre,  
3rd Fl., Next to Century Bazar,  
Dr. A.B. Rd., Worli, Bombay 400  
025. Tel: 4932653, 3076541.

The Panchal Workshop -- See  
under "Ice-Cream Making Ma-  
chines"

Tinmaco Engg. Co. (Bombay)  
Pvt. Ltd.-- See under "Tin Can  
Machinery Machine"

Unique Flexo Packaging -- See  
under "Automatic Form-Fill-Seal  
machines".

W.R. Grace & Co. (India) Pvt.  
Ltd. -- See under "Packing Materi-  
als"

Waterproof Corporation Pvt.  
Ltd. -- See under "Case Sealing  
Systems"

Wonderpack Industries (P) Ltd.  
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gies Pvt. Ltd. 404 Taramandal  
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Hyderabad 500 004. Tel: 241216/  
597798. Fax: (040) 599068.

## **MACHINERY, SHRINK WRAPPING**

See also "Shrink/Skin Wrap-  
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## **MACHINERY, SOFT DRINKS**

Goma Engineering Pvt. Ltd.--  
See under "Beverage Processing  
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Steelsworth Ltd., Circular

Court, 8 A.J.C. Bose Rd., Calcutta  
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Goma Engineering Pvt. Ltd. --  
See under "Beverage Processing  
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## **MAGNETIC EQUIPMENT**

McNally Bangalore Industries  
Ltd.-- See under "Dehydration  
Plant/Equipment"

## **MAGNETIC SEPARATORS**

Perfect Magnets Pvt. Ltd.,  
14 /1 Vishwabharti Co-op. Hsg.  
Society, Akshay Bldg., V.P. Rd.,  
Andheri (W), Bombay 400 058.  
Tel: 6212570, 8379336.

## **MALEIC ACID**

Olin Chemicals -- See under  
"Acetic Acid".

## **MALT & GRAIN HANDLING EQUIPMENT**

Goldin (India) Equipment Pvt.  
Ltd. -- See under "Grains & Cere-  
als Cleaning/Grading Machinery".

## **MALTODEXTRINE**

Dewang Corporation -- See un-  
der "Aromatic Chemicals"

Olin Chemicals -- See under  
"Acetic Acid".

The Sukhjit Starch & Chemi-  
cals Ltd. -- See under "Starch"

Vertex Chemicals -- See under

## **"Liquid Glucose"**

## **MATERIAL HANDLING SYSTEMS**

Ducon Equipments Private Ltd.  
-- See under "Consultancy & De-  
sign"

MVS Engineering Ltd.-- See  
under "Air Dryers"

Mac Industrial Systems, C/80,  
Snehdhara Society, Dadabhai X  
Road No. 3, Vile Parle (W),  
Bombay 400 056. Tel: 8215993.

Selvel Conveyors, 17A, & 63C,  
Balaji Industrial Estate, Hanuman  
Nagar, Akurli Road, Kandivali (E),  
Bombay 400 101. Tel: 887 23 03/  
883 86 63/3899, Fax: 91-022-  
8870605.

Shirke Structurals Pvt. Ltd. --  
See under "Silo Storage System"

## **METAL CONTAINERS**

Divecha Glass Industries, 249  
Bal Rajeshwar Rd., Mulund (W),  
Bombay 400 080.

## **METAL DETECTION EQUIPMENT**

Mc Nally Bangalore Industries  
Ltd. -- See under "Dehydration  
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Rathi Industrial Equipment Co.  
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3631303.

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See under "Beverage Processing  
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Food Tech Engineers-- See un-  
der "Machinery, Food & Beverage  
Processing".

Goma Engineering Pvt. Ltd. --  
See under "Beverage Processing  
Machinery"

## **MINERAL WATER BOTTLES**

Clair Packaging Pvt. Ltd.-- See  
under "Bottle Caps & Closures"

## **MINERAL WATER FILLING PLANT**

Autopack Machines Pvt. Ltd. -  
- See under "Bottle Filling & Seal-  
ing Machines"

Food Tech Engineers-- See un-  
der "Machinery, Food & Beverage  
Processing".

Komal Industries -- See under



"Water Treatment Plants/Equipment"

Shriyan Enterprises, 12A Sagar Complex, Bombay - Pune Rd., Kasarwadi Nasik Phata, Pune 411 034. Tel: 779341. Fax: C/o. 0212-779409.

Shivsu Watek (P) Ltd., 14 Spur Tank Rd., Chetput, Madras 600 031. Tel: 8266073/8266083/8266074. Fax: 91-44-8256606.

Venus Packaging Services-- See under "Crown Cap PCV Lining Machine".

Wonderpack Industries (P) Ltd., -- See under "Biscuit Packing Machinery"

#### **MINT OIL**

Bhagat Impex Pvt. Ltd.-- See under "Essential Oils".

#### **MIXERS, INDUSTRIAL**

Cosywo Engineering Company-- See under "Chemical Plant & Equipment".

Fabdecon Engineers-- See under "Agitators".

Fibre & Fibre Products -- See under "Stirrers".

Vamp Engineers Pvt. Ltd. -- See under "Machinery, Food & Beverage Processing"

#### **MIXERS, POWDER & PASTE**

Cosywo Engineering Co-- See under "Chemical Plant & Equipment".

Fabdecon Engineers-- See under "Agitators".

Frigmaires Engineers-- See under "Agitators".

Metal Plants -- See under "Contra-Rotary Mixers".

United Technologie-- See under "Conveyors".

#### **MOBILE LIFTS (WORK PLATFORM)**

Ferro Foundries Pvt. Ltd. Yelwadi Rd., Belvadi, Mysore 571 186. Tel: 42376, 42633. Tlx: 0846-224 HPW IN. Fax: National: 0821-42052.

#### **MOISTURE REMOVAL UNITS**

MVS Engineering Ltd. -- See under "Air Heaters"

#### **MUSHROOM PROCESSING PLANT**

Food Tech Engineers-- See under "Machinery, Food & Beverage Processing".

Sangram Engineering Pvt. Ltd.-

- See under "Turnkey Plants/Projects".

#### **NITROGEN GAS PLANT**

MVS Engineering Ltd. -- See under "Air Heaters"

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Cinni Engineering Pvt. Ltd.-- See under "Boilers".

Kalpna Boilers & Chemical Plants Mfg. Co.-- See under "Boilers".

#### **OIL SEEDS CLEANING / GRADING MACHINERY**

Forsberg Agritech (India) Pvt. Ltd.-- See under "Grains & Cereals, Cleaning/Grading Machinery".

Goldin (India) Equipment Pvt. Ltd.-- See under "Grains & Cereals Cleaning/Grading Machinery".

#### **OLEORESINS**

Bush Boake Allen (India) Ltd.-- See under "Essences & Flavours".

L.B. Aroma Chemicals -- See under "Aromatic Chemicals".

Synthite Industrial Chemicals Ltd., Kadayiruppu, Kolencherry 682 311, Kerala. Tel: 04853-60285. Fax: 91-484-370405.

#### **OLEIC ACID**

Soofi Traders -- See under "Orange Oil".

#### **ORANGE OIL**

Balaji Dye Chem-- See under "Additives, Food & Beverage".

Sesu Trading Corp-- See under "Acids".

Soofi Traders, 1317 Dalamal Tower, 211 Nariman Point, Bombay 400 021. Tel: 204 3044/204 5748/2833074. Fax: 2047657

#### **ORANGE TERPENE (D - LEMONENE)**

Sequisa Exports & Imports, 4-B Pankaj Building, Vakola Bridge, Santacruz (E), Bombay 400 055. Tel: 6151919/6133390. Fax: 022-6104232.

#### **OVENS, BREAD/BISCUIT BAKING**

Admir Engineers -- See under "Bakery/Biscuit Equipment".

Aifso Enterprises, A/1, Veena Beena Apts., Sewri (W), Bombay 400 015. Tel: Off: 4137339/4130926. Res: 4137109/4134568. Fax: 91-22-4137339.

Continental Equipment (India) Pvt. Ltd.-- See under "Bakery/Biscuit Equipment".

Grovers Pvt. Ltd.-- See under "Bakery/Biscuit Equipment".

Prima Engg. Industries -- See under "Bakery/Biscuit Equipment"

Sarlech Enterprises (India) -- See under "Bakery/Biscuit Equipment"

#### **OVENS, INDUSTRIAL**

Flora Engineering Co., A-4/A-42, Laghu Udyog Kendra, I.B. Patel Rd., Goregaon (E), Bombay 400 063. Tel: 8735768. Fax: 91-22-2873059.

#### **OVENS/TRAY DRYERS**

See also "Dryers, Oven/Tray, etc.

Aifso Enterprises -- See under "Ovens, Bread/Biscuit Baking"

Continental Equipment India Pvt. Ltd.-- See under "Bakery/Biscuit Equipment".

Frigmaires Engineers-- See under "Agitators".

Thermal Instruments & Equipments, 2-1-478 Nallakunta University Road, Hyderabad 500 044. Tel: 41720

#### **OXYGEN ABSORBER**

The Panchal Workshop -- See under "Ice Cream Making Machine"

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Rushabh Plastics, 11/12 Jayesh Ind. Estate, Ramchandra Lane (Extn.) Malad (W), Bombay 400 064. Tel: 8821762/8899768. Fax: 4221633.

#### **P.P. CAPS**

A to Z Bottle Suppliers-- See under "Bottles & Jars, Glass".

Larsen & Toubro Ltd. (Packaging Div.) -- See under "Bottle Caps & Closures"

#### **P.P. CAPS MACHINERY**

Advance Packaging 10/65 Industrial Area, Kirti Nagar, New Delhi 110 015. Tel: 532388, 5410629.

Recon Machine Tools Pvt. Ltd. -- See under "Filling & Sealing Machines"

St. Joseph Engg. Works -- See under "Machinery, Packaging".

Wonderpack Industries (P) Ltd.--See under "Biscuit Packing Machinery"

#### **PACKAGING DESIGNERS**

Kalrav Packaging Co., A/62 Tarang Drug Employees Co-Op.

Hsg. Soc., Unit No. 3, Gilbert Hill, Andheri West, Bombay 400 058. Tel: 6249330, 6201584. Fax: 91-22-6236196.

#### **PACKAGING FILM**

New Plastomers India Limited, 8 Magan Mahal, 3rd Fl., Above Arasa Hotel, 215 Sir M.V. Road, Andheri (E), Bombay 400 069. Tel: 8391499, 8347977, 8327252. Fax: 91-22-8360748.

Plastic International-- See under "Packaging Material".

Samarpan Converters Ltd. -- See under "Laminated Packaging Film"

#### **PACKAGING MATERIAL**

Bhavnani & Sons Pvt. Ltd., See under "Film, Plastic/Metallized"

Clair Packaging Pvt. Ltd. -- See under "Bottle Caps & Closures"

Compacq Packaging, P-19 Vikas Compound, Vadoli, Chembur, Bombay 400 074. Tel: 5551919. Fax: 5561938.

Divecha Glass Industries (Metal Container Div.) -- See under "Containers, Metal"

Fine Plast Industries Pvt. Ltd., Sarang Street, Taher Bldg, 1st Fl., Bombay 400 003. Tel: 329303/345075. Grams: POLUDRUMS.

Plastic International, B/13, Nanddham Indl. Estate, Marol, Andheri (E), Bombay 400 059. Tel: 8320798/8322683. Tlx: 11-79498. Gr: Interplast. Fax: (011) 8366237.

Samarpan Fabricators Ltd. -- See under "Filling & Sealing Machine"

Technology Plastics Ltd.-- See under "Containers, Plastic".

W.R. Grace & Co. (India) Pvt. Ltd., 426, 3A Cross, 16th Main, III Block, Koramangala, Bangalore 560 034. Tel: (080) 5534522. Fax: (080) 553 4500.

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McNally Bangalore Industries Ltd., -- See under "Dehydration Plant/Equipment"

Machinfabrik -- See under "Cookers, Vacuum, Batch"

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Balaji Dye Chem -- See under "Additives, Food & Beverage".

Concorde Chemical Corp. -- See under "B H A".

IDL Arom International Ltd. -- See under "Gums, Food"

Indian Gum Industries -- See under "Guar Gum"

Indusmen Foods Ltd., H-10 9th Fl., "Everest", Tardeo, Bombay 400 034.

Kiran Kotak & Co. -- See under "Gelatine"

Olin Chemicals-- See under "Acetic Acid".

Pecti - Chem Industries, 47 MIDC, Jalgaon 425003. Tel : (0257) 40510, 40535.

Saisha, Saisha House, 386 HAL Second Stage, Bangalore 560 008. Tel: 080-5280255. Fax: 080-5282384

Sesu Trading Corporation-- See under "Acids".

Southern Citrus Products (P) Ltd., Gudur 524101, Nellore Dist., A.P. Tel: 21328/21528.

Vidarbha Pectins Fruits Products Co. Ltd.-- See under "Calcium Citrate"

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Shivsu Watek (P) Ltd.-- See under "Mineral Water Plant Machinery"

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Rathi Industrial Equipment Co. Ltd.--See under "Size Reduction Equipment".

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Shirsat Electronics-- See under "Shrink Wrapping Machines".

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Hindustan Chemical Co., 77/B Juhu Supreme Centre, 2nd Fl., Gulmohar Rd., Bombay 400 049. Tel: 6204121, 6205464. Gr: BASICCHEM. Fax: 6201544.

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Tata Honeywell Limited -- See under "Controllers, Flow, Level, Temp, etc"

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Kooling System -- See under "Chilling Plants"

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Soofi Traders -- See under "Orange Oil"

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Thermo Packaging & Marketing Corp., 12 Nanik Motwane Marg, Fort, Bombay 400 001. Tel: 270667, 270768.

W.R. Grace & Co. (India) Pvt. Ltd. -- See under "Packing Material"

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Machine Craft -- See under "Blister Sealing Machines"

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Swastik Packaging -- See under "Impulse Sealer".

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Sesu Trading Corp.--See under "Acids".

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Olin Chemicals--See under "Acetic Acid".

Sesu Trading Corp.--See under "Acids".

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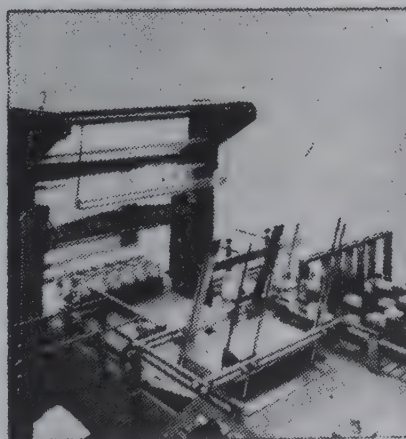
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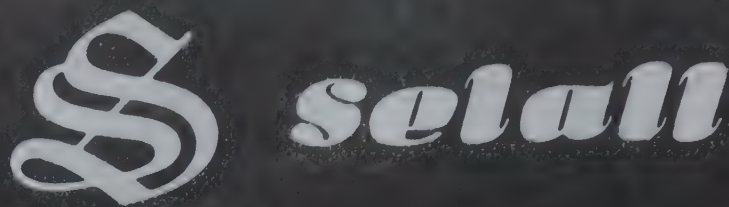
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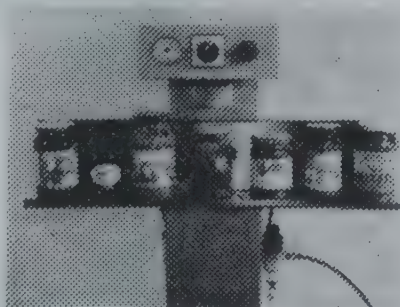
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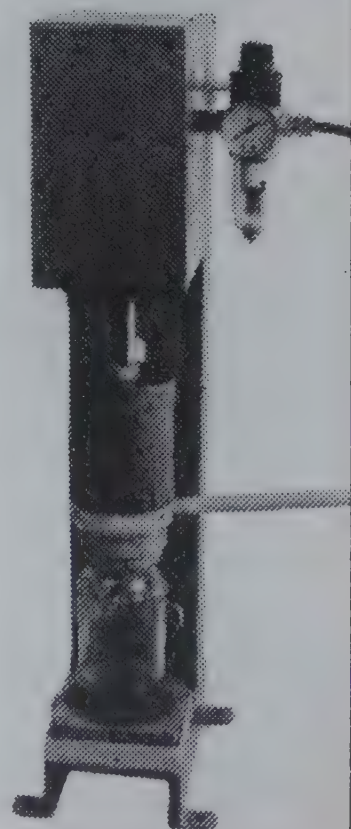


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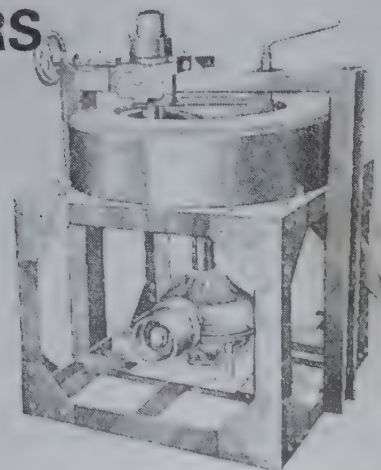
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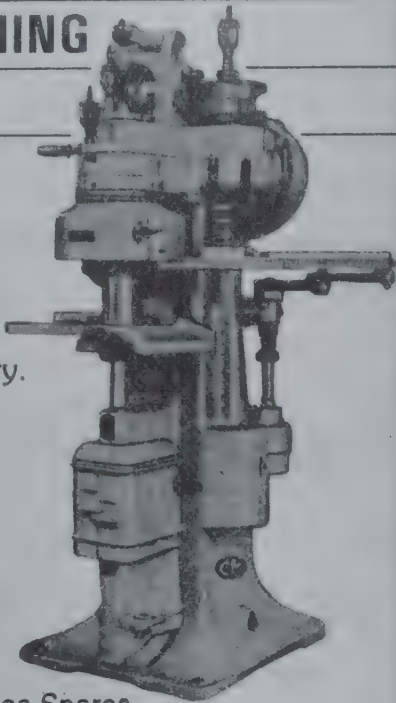
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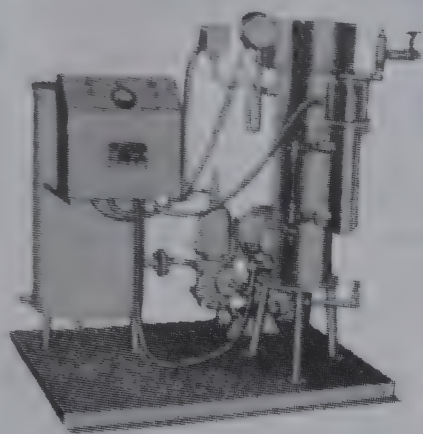
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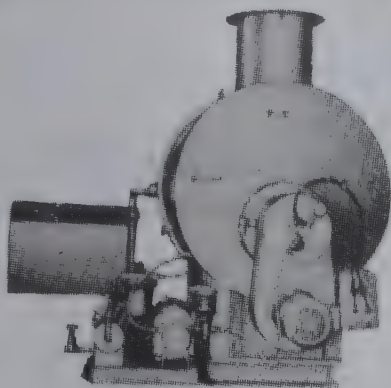
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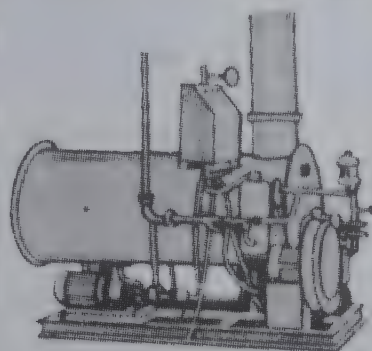
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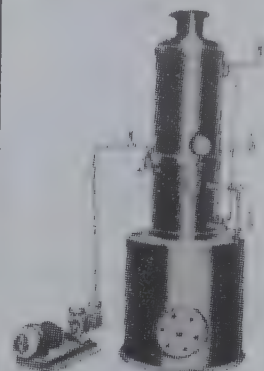
ELECTRODE BOILER



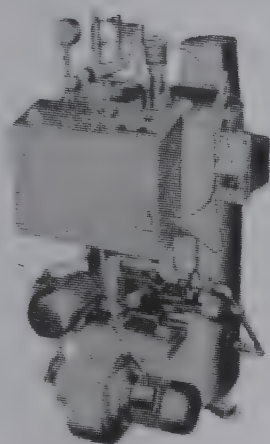
HORIZONTAL BOILER



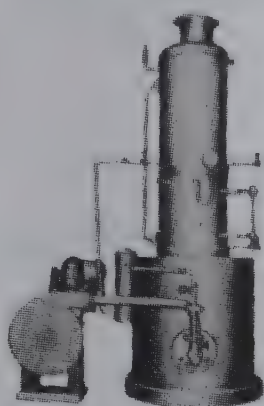
HOT-WATER BOILER



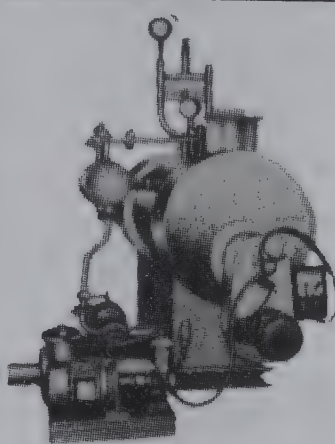
VERTICAL  
COAL FIRED



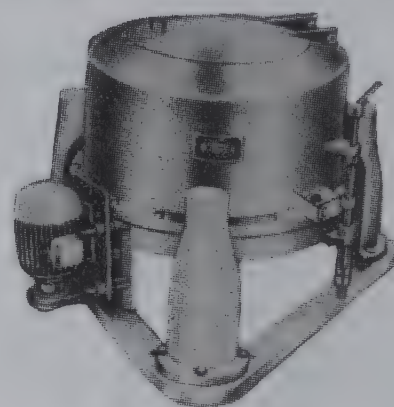
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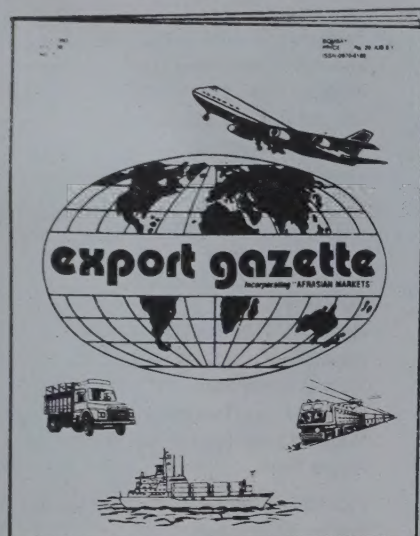
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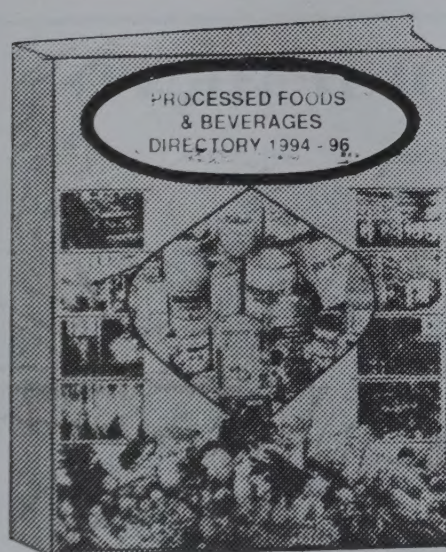
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# INDEX TO ADVERTISERS

Page No.	Page No.	Page No.	Page No.
A.P. Batliwala ... 71	Firoz Gruh Udyog ... 76	Kumar Process Consultants & Chemicals Pvt. Ltd. Front Cover	Safex Systems ... 118
Aarkay Wrapping Machines Pvt. Ltd. ... 118	Fisher-Rosemount India Ltd. ... 2	Lab Instruments ... 182	Saisha Industrial Corp. ... 167
Ace International ... 73	Fisher-Rosemount India Ltd. ... 3	Larsen & Toubro Ltd. ... 9	Sagorserve ... 87
Ace Water Purifiers Pvt. Ltd. ... 104	Flocon Valves & Pumps ... 104	Liberty Industries ... 160	Samarpan Convertors Ltd. ... 162
Adam Fabriwerk Pvt. Ltd. ... 119	Foil Impex (Bombay) Pvt. Ltd. ... 43	McNally Bangalore Industries ... 12	Samarpan Fabricators Ltd. ... 31
Aditi Pectins (P) Ltd. ... 121	Food Associates Bangalore ... 170	McNally Bangalore Industries ... 68	Sangram Engg. Ltd. ... 117
Admir Engineers ... 4	Food Tech Engineers ... 101	MVS Engineering Ltd. ... 163	Santosh Engg. & Fabricators ... 142
Aifso Enterprises ... 7	Forsberg Agritech (India) Pvt. Ltd. ... 27	Mac Industrial Systems ... 16	Sayaji Sethness Ltd. ... 1
Alok Chem Corporation ... 135	Gadekar & Associates Pvt. Ltd. ... 64	Madhura Int'l ... 43	Selall ... 172
Alweyn Pumps & Systems Pvt. Ltd. ... 129	Ganesh Benzoplast Ltd. ... 148	Manikant Bros. ... 175	Selvel Conveyors ... 14
Ambica Machine Tools Co. ... 30	Ganga Singh Sukhwinder Singh Engg. Pvt. Ltd. ... 133	Manish Chemicals ... 173	Shirke Structurals Pvt. Ltd. ... 154
Amrut Gums (Food Div.) ... 175	Geeta Food Engineering ... 103	Manoj Ice-Cream (Jain Dughdalay) ... 19	Shirsat Electronics ... 120
Aqua Filsep Inc. ... 32	Gipsico Laboratories ... 101	Marco Food Products ... 175	Shivjee Liladher (Estd. 1932) ... 173
Arctic India Sales ... 180	Globe Gas Equipments Industry Pvt. Ltd. ... 134	Metal Plants ... 157	Shivsu Watek Pvt. Ltd. ... 5
Arya Bhavan Sweets ... 39	Goma Engineering Pvt. Ltd. ... 105	Micron Water Treatments ... 103	Shree Ancillary Industries ... 119
Autopack Machines Pvt. Ltd. ... 133	Gopal Engineering Works ... 65	Multifrig Mktg. & Co. Pvt. Ltd. ... 102	Shree Precoated Steels Ltd. ... 11
Bangalore Test House ... 101	Grip Engineers ... 86	Naram's Food Products ... 135	Shriyan Enterprises ... 63
Bhap Tdg. Pvt. Ltd. ... 45	Grover Pvt. Ltd. ... 77	Narmada Food Colours Pvt. Ltd. ... 78	Sri Ram Foods Industries ... 77
Bhavani Pattern Works ... 90	Gujrat Essence Mart Pvt. Ltd. ... 152	Natraj Paper Box Factory ... 135	Soyghurt Food Product Co. ... 44
Bombay Engineering Industry ... 89	Hajoori & Sons ... 169	New Canara General Stores ... 78	Surger Exim ... 123
Bombay Industrial Engineers ... 172	Harish C. Khosla & Co. ... 172	Noble Polymech Corporation ... 120	Tata Honeywell Ltd. 2nd Inside Cover
Burzin & Leons Agenturen Pvt. Ltd. ... 15	Hi-Media Laboratories Pvt. Ltd. ... 137	Northstar Inc. (Rifo) ... 29	Techno Equipments ... 121
Canara Engineers Pvt. Ltd. ... 146	Hi-tech Ultraviolet Pvt. Ltd. ... 117	Olin Chemicals ... 130	Techno Link Conveyor Systems Pvt. Ltd. ... 133
Cantech Machines ... 178	IDL Chemicals Ltd. ... 174	Orbit Industries ... 151	The Panchal Workshop ... 29
Caxton Phosphates & Chemicals Ltd. ... 139	Identical Parts ... 102	Orbit Business Tours ... 83	Tinnaco Engg. Co. (Bombay) Ltd. ... 145
Chengalva Engineers Pvt. Ltd. ... 150	Indian Gum Industries Ltd. ... 13	Orbit International Technologies Pvt. Ltd. ... 32	Ultima Search ... 104
Crystal Automation Pvt. Ltd. ... 102	Indrayani Agro-Industries Pvt. Ltd. ... 177	Pest Control (India) Ltd. ... 165	Union Enterprises ... 90
D.P. Pulveriser Works ... 174	Industrial Refrigeration Pvt. Ltd. ... 119	Petrox Pvt. Ltd. ... 32	Unique Flexo Packaging ... 168
Dairy Den (India) Pvt. Ltd. ... 61	Inteventure India bv Back Cover	Pharmaco Machines ... 90	Unnati Industries ... 153
Dairymac Engg. Pvt. Ltd. ... 159	Ion Exchange (India) Ltd. ... 136	Piramal Healthcare Ltd. ... 138	V.P. Bedekar & Sons Pvt. Ltd. ... 118
Divecha Glass Industries 1st Inside Cover	J.M.B. Engg. Works ... 144	Poona Brush Co. ... 143	Vamp Engineers Pvt. Ltd. ... 161
Donromco Private Limited ... 77	Jagdish Enggn. Works ... 18	R.G. Glass Industries ... 141	Varun Industries ... 75
Ducon Equipments (Pvt.) Ltd. ... 86	Kaira Can Company Ltd. ... 69/70	Raj Products & Equipment (Foram) ... 172	Varun Refrigeration ... 130
Durai Industrial Works ... 173	Kalpna Boilers & Chem Plant Mfg. Co. ... 179	Rajdeep Plastics ... 8	Venus Packaging Services ... 19
Elma Industries ... 35	Kapadia Gumchem Industries ... 89	Rathi Industrial Equip. Pvt. Ltd. ... 80	Vertex Chemicals ... 176
Excel (F&B Triple Expo) ... 62	Kiran Kotak & Co. ... 86	Robert Walter & Co. (F.P.) Pvt. Ltd. ... 130	Vidarbha Fruit Pkts. Pvt. Ltd. ... 17
Excel - Techno Engineers Pvt. Ltd. ... 80	Komal Industries ... 147	Ross Thermal Systems Ltd. ... 120	Vinosynth Chem Pvt. Ltd. ... 155
Feroze Foods & Flavours ... 131	Kooling Systems ... 73	Rupande Food Products ... 132	Vallabhdas Kanji Ltd. ... 37
Ferro Foundries (P) Ltd. ... 174	Kothari Fermentation & Biochem Ltd. ... 88	S.A. Chemicals Pvt. Ltd. ... 149	W.R. Grace (H.K.) Ltd. ... 122
Fibre & Fibre Products ... 140	Krishna Factory ... 43	S.F. Engineering Works ... 164	Waghela Bros. ... 67
Filtech Pharamlab Pvt. Ltd. ... 20		SSP (Pvt) Ltd. ... 79	Warkem ... 6
Filtron Engineers Ltd. ... 10			Wonderpack Industries Ltd. ... 171
Filtron Engineers Ltd. ... 46			
Filtron Engineers Ltd. ... 60			

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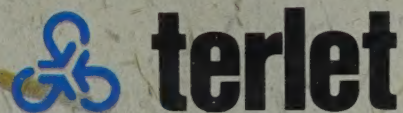




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